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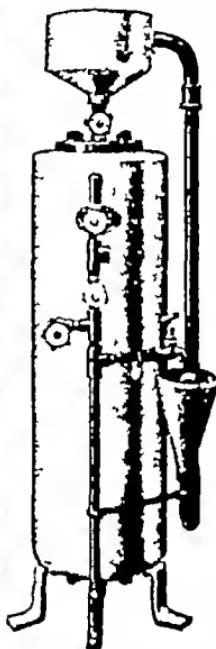
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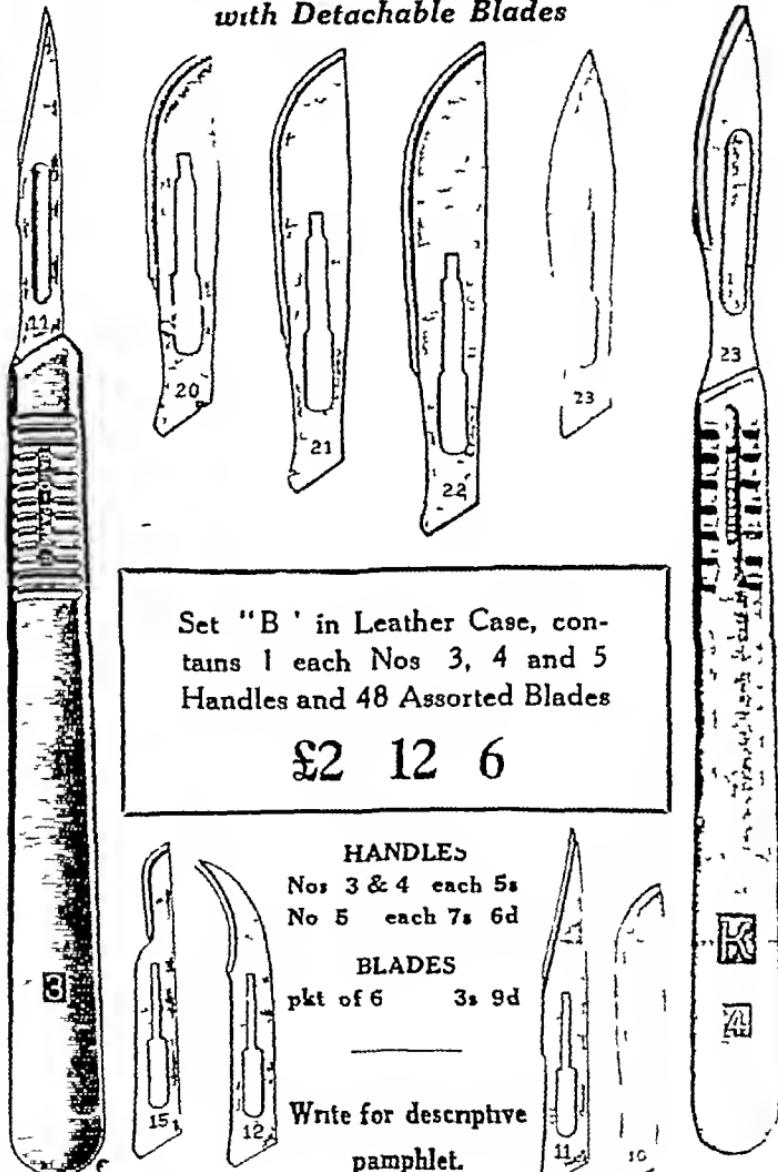
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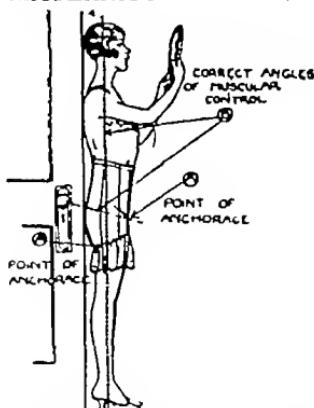
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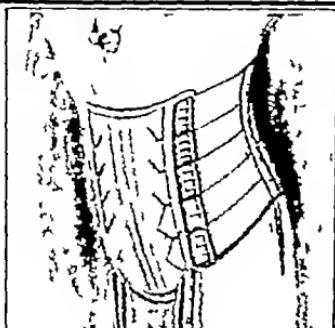
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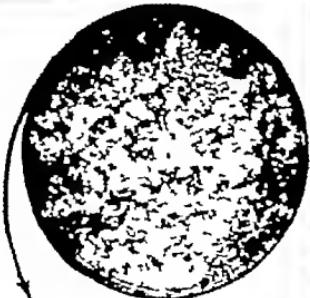
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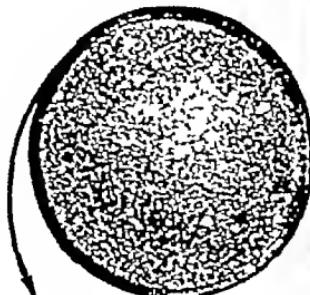
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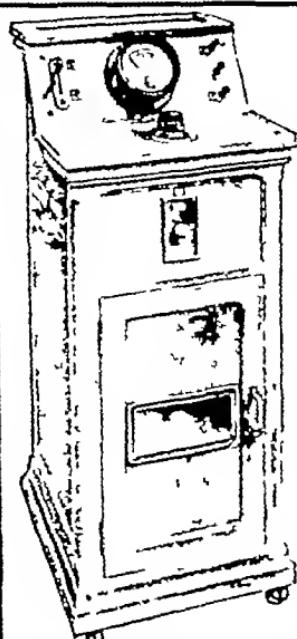
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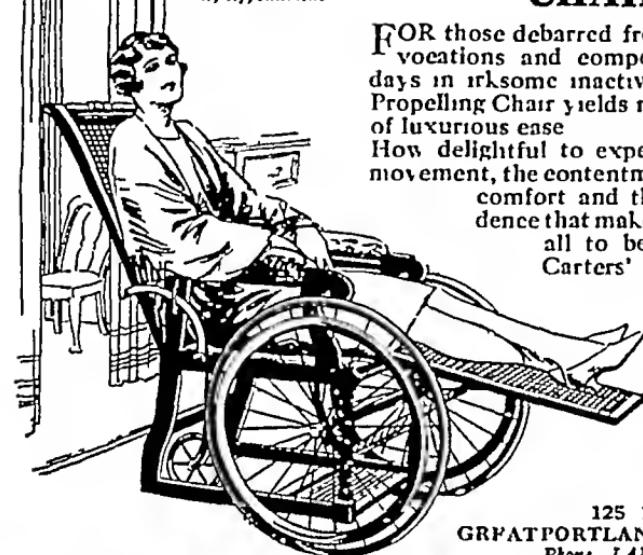
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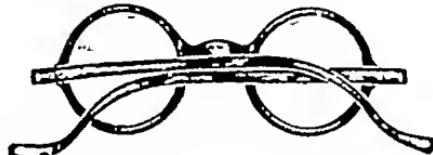
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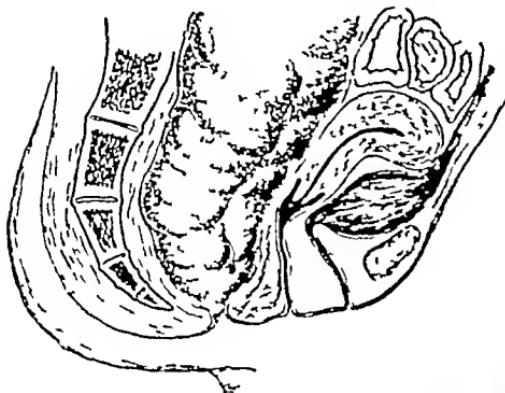
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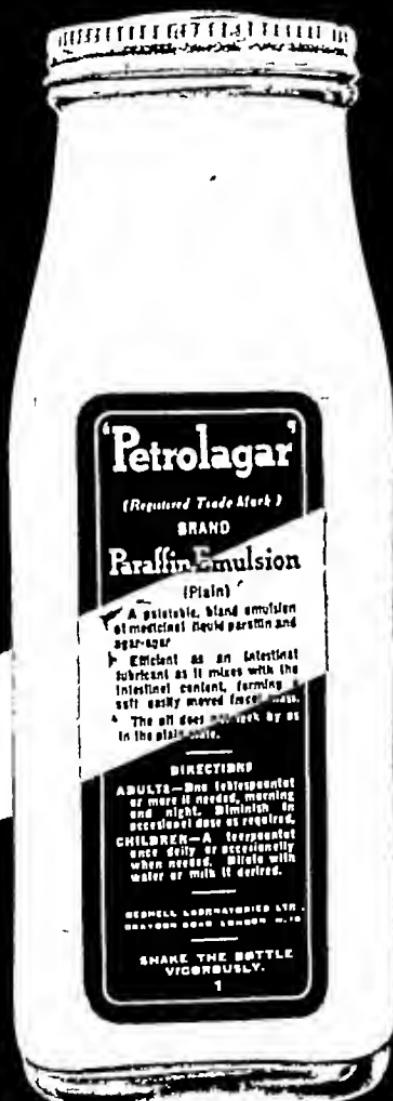
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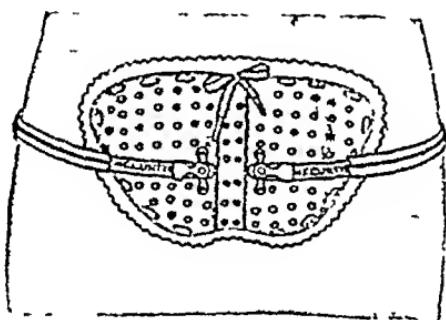
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History Patient entered hospital with a fracture which had been sustained two hours before his examination. The left humerus showed a spiral fracture with considerable shortening

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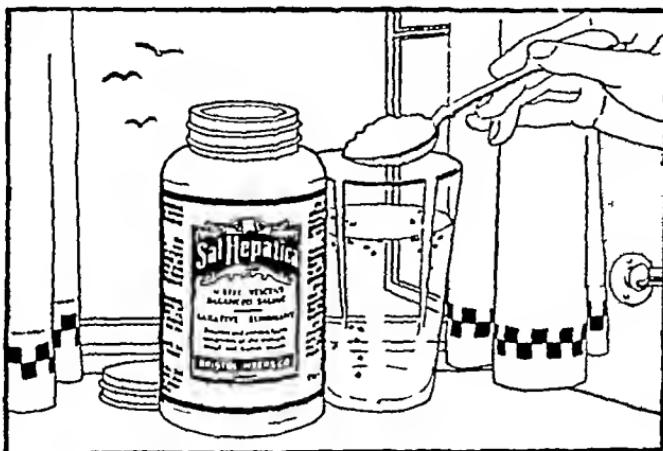
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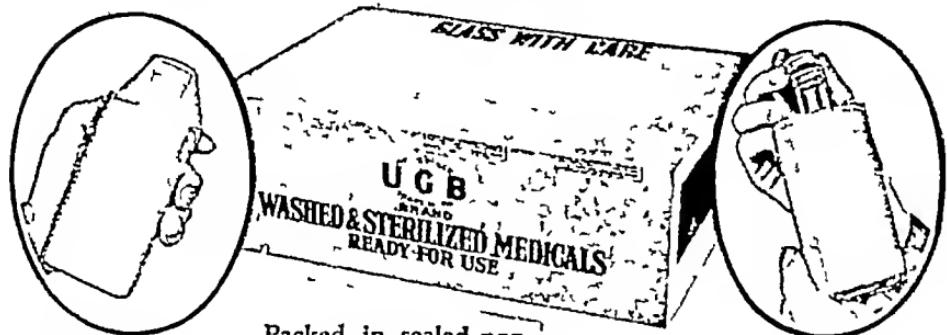
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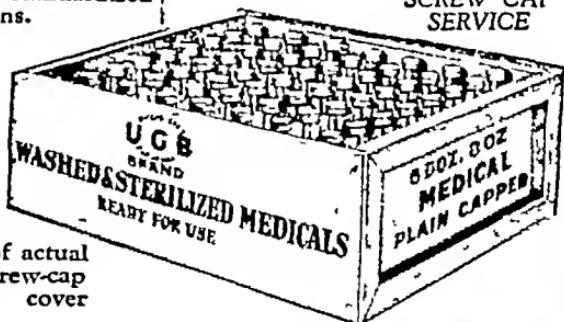
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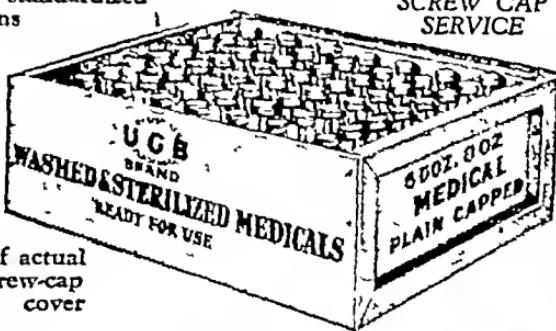
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THE PRACTITIONER

SEPTEMBER

1929

Antagonistic Phases in the Same Disease.

By SIR HUMPHRY ROLLESTON, BART., GCVO, KCB,
M.D., F.R.C.P.

Regius Professor of Physic, University of Cambridge

IT is a truism that some morbid conditions, such as obesity and emaciation, or myxoedema and exophthalmic goitre are the counterparts of each other, and also that in some instances one disease appears to cure another. This has some bearing on the practice and perhaps the principles underlying treatment; the old doctrine of treating diseases by their apparent contraries, such as fever by cold, obviously expresses this idea, and is, perhaps, an unconscious application of the example set by untreated disease. A modern adoption of this principle was the benzol treatment of leukæmia (Korányi), and of erythræmia, which was based on Selling's clinical and experimental observations that benzol, by inhibiting the blood-forming tissues, produces leucopenia and aplastic anaemia, this was derived from his observation of aplastic anaemia among workers in benzol. It may be mentioned that phenylhydrazine, which has a more selective action on the red cells, was first employed by Eppinger in the treatment of erythræmia.

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ANTAGONISTIC PHASES

characteristic symptoms, the mechanism by which this may be brought about probably varies, and so is capable of being explained in several ways. But, before going further, it may be pointed out that the occurrence of these exceptions to the rigid types set out in textbooks—a method of teaching necessary to give a working survey of medicine—emphasizes the importance of realizing that diseases are not definite and fixed things, or “entities” like a demon or a plant, but the mental concept of the reactions of the living organism in certain circumstances.

First of all it may be well to mention, so as to exclude from further consideration, antagonistic phases that form part of the clinical picture in certain morbid states, such as the rapid alternation of the high and low temperatures seen in pyogenic and other infections, and the low temperature and slow pulse-rate (due to some degree of heart-block) after the crisis in pneumonia. Cheyne-Stokes respiration represents in a rapid form the phenomena of apnæa and polypnæa.

In so-called Jacksonian epilepsy the later symptoms—paralytic—are the opposite of those in the early stage—spasmodic—because an irritating lesion eventually destroys the motor centre it first excited. But, perhaps because this is such a clear case of this sequence, it is too familiar to be striking. Paralytic chorea, or chorea mollis, is another example clinically somewhat like the last, but showing the influence of prolonged toxic effect, causing temporary exhaustion of the cells in the cortical motor areas.

In exophthalmic goitre there is a structural change in the thyroid which presumably produces an abnormal secretion and so a dysthyroidism rather than a hyperthyroidism, on the other hand, Plummer² suggests that in exophthalmic goitre there is not only an abnormal secretion (dysthyroidism), but usually an excessive normal secretion. If there is dysthyroidism alone, the

THE PRACTITIONER

return to the normal or *status quo ante bellum*; but often this is not attained; the organs or tissues are damaged and left impaired in function and structure. Compensation, however, may repair or even more than correct the damage; it is, therefore, conceivable that morbid states may be induced by excessive compensatory activity, and be the opposite of those which originally existed. It will be interesting to see if in the future any morbid conditions will be proved to depend exactly and entirely on this sequence of events. At present there are some data suggesting that this may be anticipated.

Forty years ago, in the Erasmus Wilson Lectures at the Royal College of Surgeons in 1889, Sir John Bland-Sutton formulated the view that some strictures, such as of the ileum in the situation of the attachment of the vitelline duct and of the aortic arch at the attachment of the ductus arteriosus, are due to an unnatural extension of the coalescence whereby an adjoining channel becomes obsolete. Shattock,¹ in 1890, applied this to congenital atresia of the œsophagus. This is an excess of a normal developmental process, and, though not exactly analogous to excess in a compensatory process, is perhaps worth mentioning. The healing of wounds may, by excessive proliferation, lead to a keloid scar, such as is specially seen in the negro race, thus suggesting a factor in the soil, though the possibility that this may be due to continued infection must be admitted. Cicatrization of an ulcer in the intestine or bronchi may result in obstruction, in the colon symptoms of diarrhœa and frequent evacuations during the stage of ulceration may be followed, if a cicatricial stricture results, by constipation.

It may be interesting to give a few examples in which a disease may, in its course or as a sequel, show features which are the opposite of its usual and

characteristic symptoms, the mechanism by which this may be brought about probably varies, and so is capable of being explained in several ways. But, before going further, it may be pointed out that the occurrence of these exceptions to the rigid types set out in textbooks—a method of teaching necessary to give a working survey of medicine—emphasizes the importance of realizing that diseases are not definite and fixed things, or “entities” like a demon or a plant, but the mental concept of the reactions of the living organism in certain circumstances.

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metabolic rate may be below normal and the symptoms of myxoedema may be combined with those of exophthalmic goitre Osler³ in 1898 described such cases and referred to Sollier's account of the condition in 1891. Quite recently Haines⁴ recorded a rather complicated case of exophthalmic goitre with a low metabolic rate, in which after partial thyroidectomy the administration of iodine, while improving the symptoms of exophthalmic goitre, was followed by myxoedema; the only satisfactory result was obtained by the simultaneous administration of iodine and desiccated thyroid. The symptoms of exophthalmic goitre are in the main the opposite of hypothyroidism, athyroidism, and myxoedema, and the outlook is fairly good, about 50 to 65 per cent of those medically treated getting quite or nearly well. In some cases, however, there is a gradual transition to myxoedema, so that the two conditions seem to be combined, in other instances there is a long interval between the subsidence of the symptoms of Graves's disease and the onset of those of myxoedema. Cases showing the combined symptoms may be benefited by the administration of thyroid extract, a remedy which usually aggravates the symptoms of Graves's disease, and when given in excess in cases of myxoedema, may bring on symptoms of hyperthyroidism. Hector Mackenzie⁵ pointed out that patients with Graves's disease showing solid oedema are commonly the better for thyroid treatment, and may lose the swelling almost entirely.

Acromegaly, due to over-activity of the anterior lobe of the pituitary, may be succeeded, as the result of morbid changes in, or exhaustion of, the constituent cells, by hypopituitarism, though these features are somewhat masked or thrown into the shade by the permanent changes in the skeleton induced by acromegaly. It is interesting to recall a paper read before the Historical Section of the Seventeenth

ANTAGONISTIC PHASES

International Congress of Medicine in London in 1913 entitled "Did Napoleon Bonaparte suffer from hypopituitarism (*dystrophia adiposo-genitalis*) at the close of his life?" In it the late Leonard Guthrie,⁶ who also wrote the charming "Out-patient Studies" under the *nom de plume* of "Lucas Galen," argued with successful ingenuity that Napoleon at St Helena was an example of hypopituitarism, whereas earlier in life he had been the subject of dyspituitarism and that possibly this was in the direction of hyperpituitarism. From analysis of cases of adenoma of the anterior lobe of the pituitary, Dott and Bailey⁷ found that in many cases the features of acromegaly and the hypopituitary syndrome come on synchronously rather than in sequence. Bailey and Cushing⁸ suggest the term "fugitive acromegaly" for the intermediate syndrome showing evidence of hypopituitarism with recognizable traces of hyperpituitarism, and regard this combination of antagonistic clinical manifestations as due to a distinctive form of adenoma composed of cells of a foetal type showing few and peripherally placed granules.

Hypertrophied islands of Langerhans have been described in diabetics, but it has not been established that abortive cases of diabetes become hypoglycæmic. The hope that the administration of insulin to diabetics might by giving the islands rest enable compensatory hyperplasia to occur, so that a cure is obtained, has, unfortunately, not been confirmed. A case reported by Gray⁹ raises the interesting question whether a pathological condition in the mother may lead to compensatory changes in the foetus, which are so excessive as to produce a morbid state of the opposite nature. Gray described hypertrophy and hyperplasia of the islands of Langerhans in the pancreas associated with a low blood-sugar in the infant of a markedly diabetic woman, and suggested that the maternal blood-sugar

metabolic rate may be below normal and the symptoms of myxoedema may be combined with those of exophthalmic goitre. Osler³ in 1898 described such cases and referred to Sollier's account of the condition in 1891. Quite recently Haines⁴ recorded a rather complicated case of exophthalmic goitre with a low metabolic rate, in which after partial thyroidectomy the administration of iodine, while improving the symptoms of exophthalmic goitre, was followed by myxoedema, the only satisfactory result was obtained by the simultaneous administration of iodine and desiccated thyroid. The symptoms of exophthalmic goitre are in the main the opposite of hypothyroidism, athyroidism, and myxoedema, and the outlook is fairly good, about 50 to 65 per cent. of those medically treated getting quite or nearly well. In some cases, however, there is a gradual transition to myxoedema, so that the two conditions seem to be combined, in other instances there is a long interval between the subsidence of the symptoms of Graves's disease and the onset of those of myxoedema. Cases showing the combined symptoms may be benefited by the administration of thyroid extract, a remedy which usually aggravates the symptoms of Graves's disease, and when given in excess in cases of myxoedema, may bring on symptoms of hyperthyroidism. Hector Mackenzie⁵ pointed out that patients with Graves's disease showing solid oedema are commonly the better for thyroid treatment, and may lose the swelling almost entirely.

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Severe Blood Diseases with Pyrexia.

BY F. PARKES WEBER, M.A., M.D., F.R.C.P.

Senior Physician to the German Hospital, London

PATIENTS are not rarely admitted to hospital with a rapidly fatal febrile blood-disease, in which even after a post-mortem examination it is not easy to be sure of the relation of the pyrexia to the blood-disease. There are various possibilities — (1) The pyrexia may be due to an infection of some kind, occurring simultaneously with, and possibly causally connected with, the commencement of the blood-disease (2) The pyrexia may be due to an infection of some kind grafted on an old blood-disease, that is to say, occurring in the subject of a blood-disease, though the presence of the blood-disease was not previously recognized Often, no absolute evidence of a microbial infection is forthcoming, and thus (3) the pyrexia may be a symptom of the blood-disease, occurring at the commencement of the blood-disease, or (4) only at a later or terminal stage In regard to these questions both of the following two cases are interesting, but they are likewise interesting on other grounds

(1) *A Rapidly Fatal Case of Myelosis with Pyrexia* — A well-developed young man (I.L.), aged 21 years, was admitted on May 15, 1928, with the history that he had formerly enjoyed good health, but that about seven weeks ago enlargement of the femoral-inguinal lymphatic glands on the right side was noticed This was at first not associated with any pain, but afterwards the enlarged glands became tender to pressure, this tenderness, however, was no longer present on admission For the last three weeks before admission he had been in bed and had felt severely ill, and had recently had fever There had been a question of pneumonia on the left side and the patient had had herpes labialis In regard to

may have been the stimulus which evoked the increase in the islands of Langerhans

In exceptional cases of chronic splenic anaemia and Banti's syndrome the red blood-count is raised above the normal, so that the condition has been paradoxically termed "anaemia splenica sine anaemia" (Weber and Bode¹⁰) In the course of leukaemia, even without treatment, there may be aleukæmic phases in which the leucocyte count is not increased, although the differential count is still diagnostic.

In erythræmia the hyperplasia and over-activity of the erythroblastic bone marrow may become complicated by a myelæmia as the result, it would seem, of similar change in the leucoblastic bone marrow Conversely myeloid leukaemia, in which some degree of anaemia occurs as the disease advances, has in a few instances, quoted by Weber and Bode, become complicated by erythræmia. Fatal anaemia has been known to follow erythræmia, and it is tempting to assume that this depends on exhaustion of the red bone marrow—a condition of aplastic anaemia Incidentally attention may be drawn to the remarkable similarity of the symptoms in pernicious anaemia and in erythræmia, as Christian¹¹ has shown, and their resemblance to those of cerebral anoxæmia.

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the enlarged lymphatic glands in the groin the possibility of Hodgkin's disease had been considered

On admission to hospital there was no enlargement of superficial lymphatic glands excepting those in the right femoral-inguinal region, the largest of which was of the size of a large chestnut, they were not tender to palpation. There was no evidence of disease of the intrathoracic viscera, but by Roentgen ray examination the diaphragm was seen to be high on both sides. The liver was enlarged, the hepatic dullness reaching in the right nipple line from the fifth rib to three finger-breadths below the costal margin. The spleen also appeared to be enlarged, but could not be felt till two days after admission, when the blunt lower border could definitely be palpated just below the costal margin during inspiration. On admission the patient appeared extremely ill, temperature, 101.6° F., respiration, 40 per minute, pulse, 140, of the soft "bounding" type, brachial blood-pressure, 130/30 mm Hg. *The blood-counts are given in the accompanying table*

In the hospital moderate variable pyrexia continued, and there was considerable epistaxis. Treatment by small arsenical injections and by a scarlet fever antitoxic serum was tried. The severe general condition, however, became worse, and death occurred on May 26 (eleven days after admission), after forty-eight hours of almost complete unconsciousness. Very slight enlargement of axillary lymphatic glands was detected in the hospital. A blood-culture was tried on May 22 with negative result. It may be noted that the urine contained a trace of albumin and some granular and hyaline tube-casts and many white and a few red blood-cells. The white cells in the urine were kindly estimated on May 17 by Dr Haug (after Cuthbert Dukes, *Brit Med Journ*, 1928, i, p 391) as about 45 per c mm of urine (polymorphs, 61 per cent, lymphocytes, 21 per cent, eosinophils, 6 per cent, uncertain, 12 per cent). I am especially indebted to Dr Knyvett Gordon and my colleague, Dr O B Bode, for their help in the examination of the case. A necropsy was not obtained.

Remarks.—In this case the chief question was whether the blood-picture could be regarded not as one of true myelosis (myeloid leukaemia or subleukæmic myelosis), but as the expression of a "myeloid" instead of the ordinary leucocytic reaction to some infection, that is to say, whether the blood-picture was due to the escape of myelocytes and myeloblasts into the blood-stream owing to an intense "leucoblastic" reaction in the bone-marrow (perhaps with myeloid transformation of the spleen). The moderate pyrexia in this case hardly supported the infection theory.

BLOOD DISEASES

Table of Blood-counts in the case of I. L.

Date	Hemo- globin per cent.	Leuko- cytes per 0.1 mm. of blood.	White Cells per c.mm. of blood	Poly- morphs per cent.	Lympho- cytes per cent.	Mono- cytes per cent.	Eosino- phils per cent.	Meta- myelo- cytes per cent.	Mye- lo- cytes per cent	Mye- lo- blasts per cent	Thromo- cytes per c.mm. of blood.
1920 May 15 ¹	74	3,476,000	30,200	384	161	54	0	3	173	53	203
May 18 ²	54	2,900,000	14,000	30	18	6	0	6	12	4	13
May 19 ³	—	3,050,000	21,500	50	17	3	0	1	12	13	5
May 22 ⁴	46	2,620,000	23,000	43	13	4	0	0	16	9	—
May 25 ⁵	—	—	10,050	42	21	1	0	1	23	7	5

¹ No nucleated red cells, slight anisocytosis and polychromatophilia, hardly any polkilocytosis. Two peroxidase reaction was positive in 85 per cent of the white cells.

² Six per cent of the white cells were not classified. Two normoblasts were seen to 100 white cells. I am indebted to Dr. Knyvett Gordon for this count. No nucleated red cells seen.

³ Polkilocytosis

⁴ Three normoblasts to 100 white cells. Slight anisocytosis. No polkilocytosis.

⁵ Three normoblasts and three megaloblasts to 100 white cells.

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1929 May 15 ¹	74	3,470,000	30,200	38 ¹	10 ¹	6 ¹	0	2	17 ¹	5 ¹	20 ¹	—
May 18 ²	51	2,000,000	14,000	30	18	0	0	6	12	4	13	—
May 19 ³	—	3,050,000	21,500	50	17	3	0	1	12	6	300,000	—
May 22 ⁴	46	2,530,000	23,000	43	13	4	0	0	10	10	0	—
May 25 ⁵	—	—	10,050	42	21	1	0	1	23	7	5	—

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No nucleated red cells seen Slight anisocytosis and polychromatophilia, no
polikilocytosis
Three normoblasts to 100 white cells Slight anisocytosis No polikilocytosis
Three normoblasts and three megaloblasts to 100 white cells

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A similar question arose in the case of a man (W.N.), aged 66 years, who died in the hospital in November, 1926, from peritonitis in connection with prostatic abscess. Ten days before his death a count gave 3,492,000 erythrocytes and 11,100 white cells per c mm. of blood. Of the white cells 15 per cent. were myelocytes and 16 per cent. were metamyelocytes, the lymphocytes were only 4 per cent. Even the necropsy hardly settled the question, for though the greatly enlarged spleen was myeloid, there was no typical leukæmic infiltration of the liver, which was slightly cirrhotic.

That a well-developed blood-picture of aleukæmic or subleukæmic myelosis may exist without any other signs of leukæmia was recently demonstrated to me by my colleague, Dr E. Schwarz, in the case of a man (J.F.), aged 56 years.

The man complained of rapid loss of body-weight. Examination for diabetes mellitus, pulmonary tuberculosis, carcinoma, etc., gave negative results, and there was no enlargement of the spleen or superficial lymphatic glands, but a blood-count (April 24, 1929) gave erythrocytes 4,240,000, white cells 8,450 (afterwards the white cell count went up somewhat), of which 4 per cent were myeloblasts, 19 per cent were myelocytes, and 13 per cent were metamyelocytes, a positive peroxydase reaction was given by 70 per cent of the white cells. There was marked anisocytosis, and one normoblast and two megaloblasts were seen during a count of 100 white cells.

In this last case (J F.) the myelosis was revealed by a blood-count as part of a routine examination carried out on account of the absence of all obvious signs of disease to account for the loss of body-weight and subjective symptoms. It is clear, therefore, that in leukæmic cases with acute febrile symptoms soon followed by death, the commencement of the leukæmia cannot be

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dated by the commencement of the pyrexia or acute symptoms; these latter may have been long preceded by a more or less latent leukæmic state.

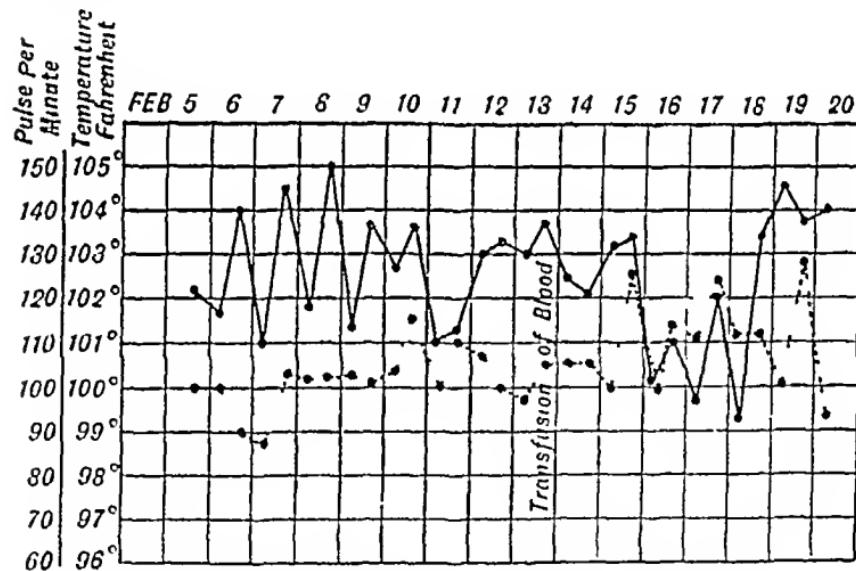
In the case of the young man (I.L.) under consideration the various questions that arise must, I think, be left without any quite decisive answer.

(2) *A Fatal Case of Anæmia with Rapid Aplastic (Hypoplastic) Termination*—This case derives its chief interest from the exact history of the patient's previous illness which was afterwards obtained. A young man (G.D.), aged 21 years, English, omnibus conductor, was admitted to the German Hospital on February 5, 1929, with great anæmia and weakness, frequent pulse, and pyrexia. He was said to have Addisonian (pernicious) anæmia, but the exact history was obtained later on, and for it I have to thank Dr G. W. Ronaldson, the senior medical officer of the Eastern (Fever) Hospital, Dr E. T. Bailey of the Hackney Hospital, and Dr W. E. A. Worley, who saw the patient at his home. As a boy the patient seems often to have had epistaxis. From July 13 to July 24, 1928, he was in the Eastern Hospital, to which he had been sent for supposed diphtheria, after having been ailing with his throat for six weeks. In the Eastern Hospital the diagnosis arrived at was Vincent's sore throat. There was also striking anæmia (*see the table of blood-counts*), with moderate pyrexia and a frequent pulse. The edge of the spleen was palpable. There were no haemorrhages, excepting rather severe epistaxis on one occasion. The faecal condition cleared up under arsenical paints. Liver diet (although the patient took it well) did not then seem to improve the general condition. He was transferred to the Hackney Hospital on July 24 and remained there till September 11. There, in addition to liver, he received a liver extract, and his haemoglobin gradually rose from 25 per cent on July 26 to 70 per cent on September 5 (*See table of blood-counts*). The moderate pyrexia continued till July 29, and for the rest of the time in the Hackney Hospital he was practically free from fever. On one occasion in August he had slight epistaxis, but his general condition steadily improved.

After leaving Hackney Hospital (July 24, 1928) liver treatment and hydrochloric acid were continued at first, but soon he got a job as an omnibus conductor and (perhaps owing to his work) gave up the liver treatment. He had severe epistaxis in October 1928. "He had a bad taste in his mouth and looked pale," and heard pulsation in his ears. Dr Worley saw him a week before his admission to the German Hospital, when he had fever and was "vomiting everything," the liver of course included.

In the German Hospital (from February 5, 1929) he did badly. Liver diet was tried as long as the patient could eat. Considerable fever continued, the anæmia increased, and in spite of a large blood-transfusion (500 c.c.m.) on the evening of February 13, he died on February 20 (*See his temperature and pulse chart and the*

(table of blood-counts) During part of the time he was in a semi-delirious state with mental euphoria A blood-culture (February 6) gave negative result A sore formed on the hard palate, apparently having commenced as a submucous haemorrhage Severe epistaxis, which started on the evening of February 15, may have hastened the fatal termination Amongst other points I may mention that the brachial blood-pressure (February 7) was 95/35 mm Hg The blood-serum gave negative Wassermann and Meincke reactions Ophthalmoscopic examination showed retinal haemorrhages in the neighbourhood of the optic discs The spleen was moderately enlarged The superficial lymph-glands were not enlarged The heart appeared to be dilated and (by X-ray examination) "centrally placed" There was no gastric achlorhydria or hypochlorhydria (somewhat against the idea of the case being one of ordinary pernicious anaemia) The urine, which on February 6 was free from albumin and sugar, contained on February 15 and later 4 to 8 per mille albumin (by Esbach's tube) and a few tube-casts, there was some excess of urobilinogen The albuminuria might perhaps in some way have been connected with the blood-transfusion There was no family history of any blood-disease



Temperature and pulse (dotted) chart in the case of G D

Necropsy (Dr Scholtz) —The heart (weight 350 grammes) showed some hypertrophy of the left ventricle, there was no endocarditis or valvular disease of any kind, a few epicardial petechiae were noted The lungs showed no tuberculosis or other disease The liver was enlarged (1,850 grammes) The spleen was enlarged (300 grammes) and reddish-purple on section, no perisplenitis The kidneys (weight together, 350 grammes) were pale in appearance Nothing obviously abnormal was noted in the other viscera, including the testes A para-aortic lymphatic gland, which had a slightly reddish colour, was removed for microscopic examination The bone-marrow

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was examined in the lower two-thirds of the right femur. It was red throughout, and a portion was removed for microscopic examination. There was no icteric tinge of the sclerotics.

Dr Knyvett Gordon kindly examined the *microscopic specimens* and gave me the following short report: "The kidney shows no histological abnormality. The liver and spleen both show engorgement with erythrocytes, such as is commonly found in death from a failing heart. The splenic pulp, except for this engorgement, is normal, there is, for instance, no sign of endothelial proliferation, nor are phagocytic giant-cells present. The Malpighian bodies show slight exhaustion, and the *præ-lymphocytic* cells have practically disappeared, having been transformed into adult lymphocytes. The changes in the lymphatic gland may best be described as exhaustion. The lymphocytes themselves show no histological abnormality, but they are much scantier than normal, and it is obvious that the gland has not been producing its full quota of lymphocytes. The bone-marrow is, in my opinion, quite typical of aplastic anaemia. Beyond a few macro-normoblasts (megaloblasts) practically no marrow cells are visible, a few scattered lymphocytes and polynuclear leucocytes are present."

Remarks—The great improvement in 1928 accompanying prolonged liver treatment suggests that this case was one of true Addisonian anaemia, and that the first part of the relapse was due to the discontinuance of the treatment. A counter-infection of some kind (in spite of the negative blood-culture) may have then led to the terminal febrile and aplastic (hypoplastic) phase of the disease. If that be so, however, it is remarkable that there was no gastric achlorhydria or even hypo-chlorhydria—especially remarkable at least from the point of view of those who maintain that achlorhydria is a condition necessary for the development of true Addisonian anaemia. It must also be remembered that great improvement under liver treatment does not by itself absolutely prove that a case of anaemia is of the true Addisonian type¹. Moreover, the patient's youthful age was somewhat exceptional for true Addisonian anaemia.

CONCLUSIONS

Practical conclusions from the cases which I have described or referred to in this paper are—(1) that in

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Table of Blood-counts in the case of G.D.

Date	Hemo- globin per cent.	Erythro- cytes per mm. of blood.	Colour index	White Cells per c.mm. of blood	Poly- morphs per cent.	Lym- pho- cytes per cent.	Mono- cytes per cent.	Baso- phils per cent.	Eosino- phils per cent.	Mela- myco- cytes per cent.	Throm- bocytes per c mm. of blood	Normo- blasts to 100 white cells	Megalo- blasts to 100 white cells	Aniso- cytes per cent.	Polypo- cytosis
1929															
Feb 7	30	1,360,000	1.1	1,550	1.0	83	2	0	0	4	1	18,000	—	—	+
Feb 11	19	1,260,000	0.8	900	1.5	54	5	0	0	3	17	—	5	1	+
Feb 13	17	640,000	1.3	1,420	1.1	51	1	0	0	12	25	None found	5	7	+
Feb 14 ¹	27	1,850,000	0.84	900	2.0	37	0	2	0	12	29	Hardly seen	2	3	+
Feb 18	16	928,000	0.9	3,000	1.6	59	4	0	0	2	19	None seen	3	4	
1928															
About July 13 ²	—	1,720,000	—	2,000	—	—	—	—	—	—	—	—	—	—	
July 26	26	1,180,000	1.06	3,800	0.1	38	0	0	1	—	—	—	0	0	
Sept. 6	70	3,800,000	0.9	5,800	53	43	2	0	1	—	2	—	0	0	+

¹ This count was made 10½ hours after the transfusion of 600 c cm blood (from a donor of Group 3), which had been followed by a feeling of shivering but no rigor.

² No abnormal cells were seen, but there was a relative lymphocytosis.

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regard to blood-diseases an endeavour should be made to obtain the diagnosis as early as possible, and (2) that in anaemic cases which have been once benefited by liver or liver extract this treatment should not be discontinued unless under strict medical supervision. At blood-count should be part of the routine examination in cases of rapid failure in weight and strength when the usual causes of such symptoms are absent. An earlier diagnosis will become still more important in the future if therapeutic progress occurs in other blood-diseases comparable to that which has recently occurred in regard to pernicious anaemia.

It is just possible that information of some diagnostic value may be obtained by the quantitative and qualitative (differential) count of the white cells present in the urine in blood-diseases and in cases of blood-reactions of microbial or toxic origin. This is suggested by the finding in my first case (I L.)

For help in the investigation of the cases I have to thank the house physicians, Dr Knop and Dr Scholtz, and likewise Sister Matilda in the Pathological Department of the German Hospital. In regard to points already mentioned I am greatly indebted to my colleagues, Dr E Schwarz and Dr O. B. Bode, and also to Dr Knyvett Gordon, who has so kindly assisted me with his special knowledge of the subject.

Reference

¹ See, for instance, S C Dyke, "Liver Therapy in Secondary Anaemia," *Lancet*, London, 1929, i, p 1192. See also numerous published accounts of cases of anaemia, not of the Addisonian type, that have decidedly improved under liver treatment, many such cases have been reported in France.

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Table of Blood-counts in the case of G.D.

Date	Hæmoglobin per cent.	Erythrocytes per 0.mm. of blood.	White Cells per 0.mm. of blood	Colour index	Poly-morphs per cent.	Lym-phocytes per cent.	Mono-cytes per cent.	Eosino-phils per cent.	Meta-myo-cytes per cent.	Myclo-zytes per cent.	Throm-bocytes per c mm. of blood	Megaloblasts to 100 white cells	Aniso-zytosis	Polklo-cytosis
1929														
Feb 7	30	1,300,000	1.1	1,550	10	83	2	0	0	4	1	18,000	—	+
Feb 11	19	1,250,000	0.8	900	15	54	5	0	0	9	17	—	3	+
Feb 13	17	640,000	1.3	1,420	11	51	1	0	0	12	25	None found	5	+
Feb 14 ¹	27	1,850,000	0.84	000	20	37	0	2	0	12	29	Hardly any seen	3	+
Feb 18	15	928,000	0.8	3,000	10	50	4	0	0	3	10	None found	3	4
1928														
About July 13 ²	—	1,720,000	—	2,000	—	—	—	—	—	—	—	—	—	—
July 20	25	1,180,000	1.06	3,000	01	38	0	0	1	—	—	—	0	0
Sept. 6	70	3,900,000	0.9	6,800	53	42	2	0	1	—	2	—	0	0

¹ This count was made 10½ hours after the transfusion of 500 c.c.m. blood (from a donor of Group 3), when bad been followed by a feeling of shivering but no rigor.

² No abnormal cells were seen, but there was a relative lymphocyte to

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deal of the pain and discomfort associated with the disease. It is of great importance that the patient should be carefully informed of the nature of and reasons for colostomy and his full acquiescence obtained. One of my patients who had not been informed previously as to the nature and objects of the operation committed suicide on discovering his colostomy.

Where "early" colostomy is to be done for inoperable rectal carcinoma, the opening is best made into the lower end of the descending colon or part of the iliac colon, preferably the latter. The incision in the abdominal wall varies with different schools of surgery. Probably the best incision is one which splits the left rectus muscle for about two inches just below the umbilicus. It is important not to make the incision either too low or too much toward the flank, in either of which positions the fitting of belts and cups may be rendered difficult owing to the bony prominences of the pubes and anterior superior iliac spine. During the incision through the rectus sheath and muscle, care should be taken to avoid wounding the deep epigastric vessels if possible, and during the closure of the abdominal wall, in addition to meticulous care in the approximation of peritoneum and rectus sheath, the spht muscle should be carefully drawn together immediately above and below the extruded loop of colon.

Subsequent hernia through the abdominal incision may be in large measure prevented by care during the closure of the incision. Also a rectus muscle which is not bruised or torn, but gently split and not separated too much from its sheath and neuro-vascular connections may not only prevent a future hernia, but may confer on the colostomy a certain amount of voluntary quasi-sphincteric control.

When, later, the bowel is opened it should be by means of a simple linear incision of about one and a

On the Care of a Colostomy.

By C H SHORNEY WEBB, M.S., F.R.C.S
Surgeon to the Middlesex Hospital

THE possession of a properly performed and well managed colostomy can alleviate in great measure the pain and discomfort caused by an inoperable carcinoma of the rectum, the commonest condition for which colostomy is required. On the other hand, a colostomy badly performed and badly managed can add considerably to the misery to which the patient is already subjected.

It is a melancholy fact that of the patients who seek hospital advice and treatment for carcinoma of the rectum, in between 70 per cent to 80 per cent the primary growth is found to be irremovable owing to fixity, presence of secondary deposits, or other reasons. Nothing is then left to the surgeon save palliative measures, and of these colostomy is the most useful and important. It is not proposed to speak of radium save to condemn its use in all but a very few cases.

When it has been decided that the growth does not permit of extirpation, the question arises, when should the colostomy be performed? Broadly speaking, colostomy may be performed at one of two periods after the primary growth has been pronounced inoperable (a) As soon as possible, or (b) at a late stage as an emergency measure to relieve the terminal acute obstruction. There is little to recommend this latter method and much to be said in favour of the former.

The surgeon can truthfully tell his patient that consent to an early colostomy will ensure a somewhat longer expectation of life and the avoidance of a great

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The patient should be made interested in this attempt to form a habit, and his mental co-operation obtained. It is well worth his while to take a little trouble soon after breakfast so that the rest of the day shall be spent in comparative comfort, untroubled by repeated small evacuations into the dressings. The ideal of a single morning emptying of the colon above the colostomy is possible and does occur. In the interval between the operation and the terminal stages of the disease, a well-formed, after-breakfast motion, emptying the colon, which for the rest of the day remains quiescent, should be the rule

Frequent, irregular action is usually due to —

- (1) The ill-judged use of purgatives
- (2) Errors of diet
- (3) Inflammatory conditions of the colonic mucosa ascending from the colostomy

The third possibility, ascending colitis, is most likely to occur in the presence of an irregularly-acting or dribbling colostomy. The mere presence of well-formed faeces in the dressings under the cup or belt, unless left there for any length of time, will not cause infection of the colon mucosa. Dirty dressings, dirty enema nozzles or catheters, or carelessly prepared wash-outs are far more liable to initiate an ascending coitis with consequent mucorrhœa, diarrhoea pain and possibly bleeding.

Irrigation of the colon and rectum below the colostomy is of the greatest value. The irrigation is best performed by way of the lower colostomy opening, the effluent being received into a bedpan per anum. Plain water or, better, mildly antiseptic lotions, such as boric and flavine, eusol or Milton may be used in an attempt to control to some extent the bacterial population of the primary growth and adjacent mucosa, thereby tending to reduce vascularity, rapidity of growth, and the painful throbbing of congestion.

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quarter inches. Nothing should be cut away from the edges of the incision. An ultimate distance of at least one inch between the upper and lower openings should be aimed at, and a certain amount of protrusion of the intervening "spur" encouraged. Unless faeces are prevented by an efficient "spur" from passing from the upper into the lower colostomy opening, and so over the rectal growth, one of the main objects of the operation will have failed.

To ensure the best results and greatest comfort, it is essential to take pains to teach the patient how to look after his colostomy, and a real attempt should be made to "educate" the colostomy and bowel above. A colostomy that is day and night dribbling into a cup or some form of dressing is a nuisance. With proper care a colostomy can be taught to act once or twice a day and not dribble in the interim.

As soon as the colostomy has been opened and has become fixed in a properly healing wound, plain water, or soap and water wash-outs should be employed to empty the large bowel above the opening. Purgatives should never be employed save in cases of necessity. Liquid paraffin is especially liable to produce "dribbling," and should be avoided. These "upper opening" washouts should be performed regularly at the same time each day—preferably soon after breakfast—and should be commenced as soon after the operation as possible. Generally soap and water enemas are best for about a week or ten days from the fourth day after operation, but an attempt should be made as soon as possible to replace the soap enema by a simple, warm, plain water wash-out. A regularly-timed warm water injection, diminishing in quantity from a pint at first to an ideal nothing, will act not merely as a mechanical wash-out, but as a method of inducing peristalsis of the colon, tending to establish an habitual evacuation at a stated time daily.

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Light dressings should be employed between the cup and the colostomy mucosa. With a well-behaved colostomy the dressings should be as light as possible, and should consist of gauze or fine linen soaked in liquid paraffin or smeared with some ointment such as half-strength *ung zinci oxidii*. Where the colostomy is well controlled and irregular actions are not occurring, the dressings can be quite small in amount, and should be looked upon mainly as protection for the exposed mucosa against mechanical irritation by the cup or belt to guard against infection and to absorb secreted mucus.

A cup, properly fixed, by studs or buttons, into a strong linen, calico or sailcloth belt made to the individual measurements of each patient, should be worn constantly by day when the patient is in the erect posture. In bed a cup is not so necessary, though a belt in some form must always be worn. In the event of the ideal single daily evacuation being unobtainable, and in the presence of irregular uncontrolled and unnoticed actions, larger cups and bulkier dressings will have to be employed. The incorporation of a piece of flat red rubber in the belt to cover the region of the colostomy and a fair area round it is of value in those cases where control has failed and where frequent cleansing is necessary.

In the terminal stages of the disease control generally gives place to irregularity, but belts and cups become of minor importance in face of the increasing gravity of the patient's general condition. Difficulty in the management and irregular action of the colostomy in these terminal stages may be due to :—

- (1) An established intractable infection of the colon above the opening
- (2) Constipation, often in part due to the increasing necessity for morphia.
- (3) Invasion of the colostomy by growth spreading upward from the rectum.

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Irrigation *per rectum* is not so good as the above method, and may be impracticable owing to the position and extent of the growth, and may be definitely harmful from injury to, or mechanical irritation of, the anal canal and rectal growth.

Lastly, a word or two may be said with regard to belts and cups used in connection with the colostomy. Belts should perform two functions. First, They should provide a broad, firm support for the abdominal wall, and more especially the weak spot in the abdominal wall at the site of the incision and, secondly, should form a fixation for a cup. Cups should do two things. First, provide local support for the abdominal wall in the immediate neighbourhood of the colostomy and, secondly, protect the exposed mucosa and openings of the colostomy. They should not be looked upon merely as receptacles for faeces save secondarily in the event of accidental evacuations.

Every cup ought to have a wide-based rim which should exert firm equable pressure on the abdominal parietes immediately round the colostomy. It should be perforated by four to six small holes at its summit, and should not be deep enough to allow more than a fraction of an inch between the colostomy spur and the cup's inner convexity. The rim of a cup should be made wide and flat to act as local support, and to assist in the prevention of incisional hernia. Bulging of the abdominal wall, or actual hernia, usually occurs on the outer side of the colostomy. Cups should also control the amount of protrusion of the "spur" and colon mucosa and obviate prolapse. The value of an ordinary cup as a receptacle for casual evacuations is of secondary importance save in the terminal cachectic stages of the disease. Cups should be light, and best made in celluloid or some kindred material, and should not have rubber or pneumatic rims. They should be smooth and easily washable.

Hydropericardium in the Diagnosis of Coronary Thrombosis.

By W R GROVE, B A, M.D.,
Honorary Medical Officer, Huntington County Hospital,
AND
W S GROVE, M.B., B.Ch.,
late House Surgeon, Guy's Hospital

THE diagnosis of coronary thrombosis has chiefly depended on a cardiac distress of an anginoid character, which, unlike true angina, is prolonged for hours or days, a *status anginosus*, combined with a fall of blood-pressure. Cases are now often diagnosed, but from Allan's post-mortem evidence¹ in but a small proportion only of the cases which actually occur. The object of this paper is to bring forward clinical evidence that, subsequent to the occurrence of this occlusion, a protecting pericardial fluid is secreted, which may be watched in its origin from six to twenty-four hours after the attack to its maximum in four to six days. By far the greater number go on to recovery, but no decrease in the fluid can be noted till the end of a fortnight and complete absorption is not found under three weeks.

The recognition of the formation of this fluid admits of the slighter forms of coronary thrombosis being diagnosed, but while we believe we shall be able to produce evidence that this fluid when in moderate amount can be found by ordinary percussion, yet its presence, growth and decline were only found by means of auscultatory-percussion, and therefore it is necessary to give some hints on the practice of this

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- (4) Recurring prolapse.
- (5) Intractable diarrhoea associated with widespread intra-abdominal metastases

The patient under these conditions will be bedridden and skilled nursing becomes a practical necessity.

In those cases where a successful extirpation of the rectum has been effected, and a permanent colostomy performed, the after-care of the colostomy is even more important than in the class of case where the primary growth is irremovable. Thus after-care may be summarized as consisting in.—

- (1) The avoidance of purgatives save where absolutely necessary.
- (2) Careful education of the patient and his colostomy designed to produce an habitual daily, well-formed, sufficient evacuation
- (3) Cleanliness in the handling and dressing of the colostomy, including irrigation of the rectum and growth.
- (4) The careful selection and measuring of cups and belts.

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can be mapped out as in an X-ray photograph, the note being entirely different from that of the colon. If the stethoscope be placed on the back near the side of the scapula, the limits of the lung can be made out, and it will be noted that the note is carried over the midline, a finger's breadth to the other side. This is the normal and is always the same. Going now to the front of the chest, place the stethoscope just above and internal to the right nipple where there should be no organ but *lung* beneath it, carrying the percussion to the left, the note always changes at the *left* border of the sternum, as at the back the note is carried on over the midline. We stress this as the normal, for in abnormal conditions, to be described later, something quite different is obtained.

Growth in the mediastinum and fluid in the pleural cavities can also be differentiated from the lung proper, but there is no time on this occasion for a complete description of the many uses for auscultatory-percussion. The spleen must, however, be mentioned because it is sure to cause difficulties to the beginner, and we have no doubt that these difficulties have been a contributory cause to the disuse of the method. There are three organs which may be beneath the stethoscope placed over it, spleen, lung and colon, in addition each separate rib will give its own note. The ear may therefore catch the note of the wrong organ, and a splenic enlargement be missed or the colon instead of the spleen mapped out. The best way we have found to overcome this difficulty is to percuss upwards into the axilla at first and get its upper border, the lung note then coming into evidence seems at once to tune the ear to the spleen note and the rest of the organ is then mapped out easily.

The heart is quite easy and its limits seem to be a trifle more than we get with ordinary percussion; the normal being just over the right border of the

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method, so that the difficulties, which have led to a certain amount of scepticism as to its reliability and its consequent almost universal disuse, may be overcome.

This method of defining the limits of an organ was first advocated by two Americans, Camman and Clark, in 1840. If the stethoscope is placed over the organ and the surface of the body tapped away from the stethoscope a note is heard, which remains the same as long as the tapping is over the organ, but beyond that organ's limits the note changes sharply. In the days around 1840 it is no wonder the method fell into disuse with the old wooden stethoscope, for it must have required two persons working together, one at the stethoscope and one tapping and marking the results. Even with the bin-aural there are inherent difficulties, the ear needs a certain amount of training and there are anatomical points to be remembered, but we are convinced that these difficulties can be overcome by anyone with a little steady practice; and that the method gives a power to diagnosis and a confirmation of ordinary percussion which, once learnt, will never be relinquished.

The first thing to learn is to keep the stethoscope steady, and to the beginner watching the taps of the finger it is easy to tilt the stethoscope, so that the air enters and the note appears to change before it should. Another point is that it is a *note* which is elicited, and, like a note on the piano, does not change with softness of touch or hard tapping, in fact hard tapping is sometimes advisable as the distance between the tapping finger and the stethoscope increases, in order to carry the vibrations through the distance. But generally soft tapping is the easier to distinguish.

Perhaps the easiest organ to define is the stomach, the stethoscope being placed in the epigastrium, and the difference between the standing and lying position

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sternum, and on the left *through* the nipple. In abnormal conditions to the left the method is most useful, e.g., in the dilatation of rheumatic fever and similar diseases an inch outside the nipple is a general finding, and in the first few hours of a questionable tonsillitis an enlargement of an inch outside the nipple makes it almost certain the swab will be returned as positive. And again if only to map out the heart in the so-called emphysematous chests the method is worth learning.

To learn and practise the method we should advise the course of following up ordinary percussion with auscultatory-percussion and mapping out the heart and the spleen by this method, simply as an exercise, it does not take half a minute and the normal is soon learnt. Should in either organ something seem to be abnormal and the limits found seem to be impossible, the impossible should be tried out by placing the stethoscope, not as is usual over the centre of the organ, but at the limit of the position found; if there has been no error the limits should be the same with the stethoscope on that border as in the centre of the organ.

There is one other observation which should be made on the normal heart —Mark on the chest the right border of the heart by A-P in the prone position. Then turn the patient on the *left* side and percuss again. The right limit will be found to have dropped slightly, the heart apparently falling to the lower side. It is most important to convince oneself of this phenomenon as a normal finding, for the heart itself is heavier than pericardial fluid, that was an observation made many years ago by Sibson, and quoted by Dr F T Roberts² in Allbutt's System, and, as you will hear later, at post-mortem we have found the fluid on the top of the heart. Therefore if on turning the patient to the left the right border obviously rises some distance there is probably fluid

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there, and at this stage we leave it at "probably."

Sooner or later in the auscultatory-percussion of the heart an enormous enlargement of the heart note will be found on the right side (Fig. 1). On the left there is but a slight enlargement. Such an exaggeration seems absurd, and probably the method is blamed for giving an obviously wrong finding. But give the method a further trial, as we have suggested. Place the stethoscope just above and to the left of the right nipple, that is at one of the limits found at first, and percuss again towards the left, and the note will be found to refuse to change till the tapping has gone beyond the left nipple. But in the normal the point on which the stethoscope has been placed should have nothing but lung beneath it, and the note should have changed at the left border of the sternum. But do still another test; turn the patient on to the left side, place the stethoscope over where you know the heart to be and percuss towards the right. The note will now refuse to change until you have tapped far into the axilla, that is instead of the heart's note having slightly sunk, as in the normal, it has unexpectedly risen. If the method has been satisfactory over normal organs, in this abnormal condition there must be *something* in the chest which gives a continuous note from beyond the left nipple over to the right nipple. It is impossible to imagine this is wholly heart, especially with the rise when turned on the left; what is it? Let us leave the answer temporarily while we finish off the account of this case, which was one of heart-block with classical symptoms, so that everyone will agree with the diagnosis:—

This man, aged 70, who had not been ill in the past 36 years, was found by his wife, at 7 a.m. on April 4th, lying across the bed, half dressed, foaming at the mouth. When seen a few minutes afterwards he was being supported on the w^c in ghastly pallor and cold sweat with a hardly perceptible and uncountable pulse

sternum, and on the left *through* the nipple. In abnormal conditions to the left the method is most useful, *e.g.*, in the dilatation of rheumatic fever and similar diseases an inch outside the nipple is a general finding; and in the first few hours of a questionable tonsillitis an enlargement of an inch outside the nipple makes it almost certain the swab will be returned as positive. And again if only to map out the heart in the so-called emphysematous chests the method is worth learning.

To learn and practise the method we should advise the course of following up ordinary percussion with auscultatory-percussion and mapping out the heart and the spleen by this method, simply as an exercise; it does not take half a minute and the normal is soon learnt. Should in either organ something seem to be abnormal and the limits found seem to be impossible, the impossible should be tried out by placing the stethoscope, not as is usual over the centre of the organ, but at the limit of the position found, if there has been no error the limits should be the same with the stethoscope on that border as in the centre of the organ.

There is one other observation which should be made on the normal heart —Mark on the chest the right border of the heart by A-P in the prone position. Then turn the patient on the *left* side and percuss again. The right limit will be found to have dropped slightly, the heart apparently falling to the lower side. It is most important to convince oneself of this phenomenon as a normal finding, for the heart itself is heavier than pericardial fluid, that was an observation made many years ago by Sibson, and quoted by Dr F T Roberts² in Allbutt's System, and, as you will hear later, at post-mortem we have found the fluid on the top of the heart. Therefore if on turning the patient to the left the right border obviously rises some distance there is probably fluid

HYDROPERICARDIUM

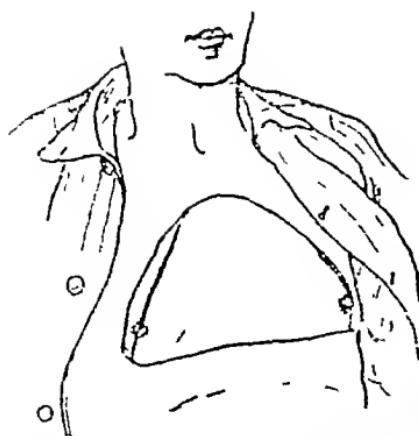


FIG 1—Coronary thrombosis, cardiac signs by auscultatory percussion 3 days after attack. The outer lines are the findings in the recumbent position, the inner when sitting up

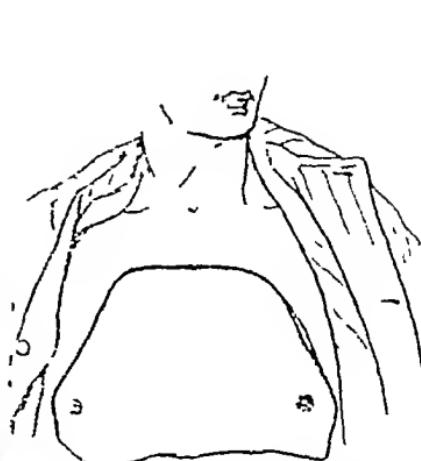


FIG 2—Same a week later (April 14th) ten days after attack.

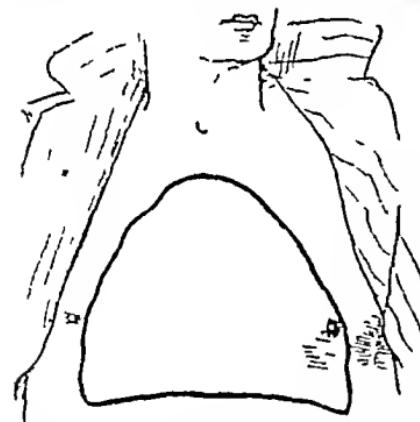


FIG 3—Same case on 17th day after attack (April 21st) with first signs of absorption

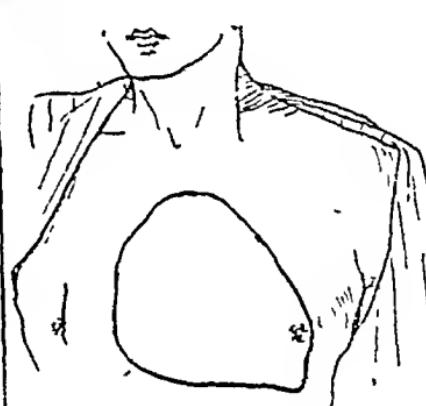


FIG 4—Same on 24th day from attack, slightly larger than normal, but, on turning over to left side, the dullness by A P rises to the nipple

This man had an obvious coronary thrombosis, affecting the heart in a vital position, yet for some hours by ordinary and by auscultatory-percussion only some dilatation in the region of the right auricle could be made out. Then in twenty-four hours by auscultatory-percussion an enlargement to the right is found which apparently increases daily, comes to a maximum in about a week, and for another week remains about the same, then these signs gradually decrease, but it has taken five weeks from the onset

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and irrational. He was carried back to bed and given a dose of opium. A few hours afterwards he was rational, complaining of pain across the chest and had no remembrance of his illness or of seeing me previously. At the wrist his pulse was 54 and irregular, his B.P. 95/75 mm. Hg, but an occasional beat came through at 105. An examination of the heart, both by ordinary and A-P, then gave only a suspicious bulging outwards in the region of the R. auricle, dilated. The next morning he was still uneasy in his chest and by A-P there was a distinct enlargement on the right half way to the nipple with still an irregular pulse. The next day, the third of his illness, an X-ray photograph was taken, showing a further increase of the right side by A-P. He expressed himself as much better but with still an uneasy feeling across the chest, the B.P. was 108/80 mm. Hg, but at the systole it was very marked that only alternato beats were coming through, the pulsus alternans, but otherwise the beat was regular in rhythm, though not in power. The inner lines in the figure are those obtained by A-P when sitting up, the outer when recumbent, this closing in when sitting up being a usual finding.

His temperature and respiration were normal and remained so throughout his illness. There was no friction sound to be made out at any time nor cardiac murmur. By ordinary percussion some slight increase of the dullness to the right seemed the only finding.

Fig. 2 was taken on April 4th, ten days after the attack, and he was considerably better, his chest uneasiness had gone and he said he felt a humbug to be in bed, but by A-P the heart's note had considerably increased, especially beyond the right nipple and rather less towards the left second space. Pulse 63 at the wrist with slight irregularity. B.P. 115/70 mm. Hg with an occasional beat not coming through but regular in rhythm.

Fig. 3, taken a week later, now shows a definite decrease of the extent of the note by A-P, his pulse both in power and rhythm was regular. B.P. 120/70 mm. Hg.

Fig. 4 on April 28th, 24 days after the attack, shows by A-P a heart slightly larger than normal, but the line nearly at the right nipple shows the point to which the dullness rose when turned on his left side. Pulse regular at 70 and B.P. 110/70 mm. Hg.

Note the collapse of the left line in the following shades.

Fig. 5 on May 5th now shows a heart slightly smaller than a week ago, but on lying on the left side there is still a distinct rise of the right sided dullness. Pulse 72, quite regular, B.P. 120/62 mm. Hg. He was allowed downstairs for a few hours to day.

Fig. 6 on May 12th, 38 days from the attack, shows a normal heart but with a suspicious bulging in the region of the right auricle, though, as far as my memory goes, it was more marked on the evening of his attack, and there is no increase of the note to the right on tilting the patient to the left. Pulse 70 regular, B.P. 125/90.

At the time of writing this man has been back at his work as a stone-mason for six weeks at which he has had no cardiac distress. His pulse is regular about 70, with a blood-pressure of 160/95 mm. Hg.

HYDROPERICARDIUM



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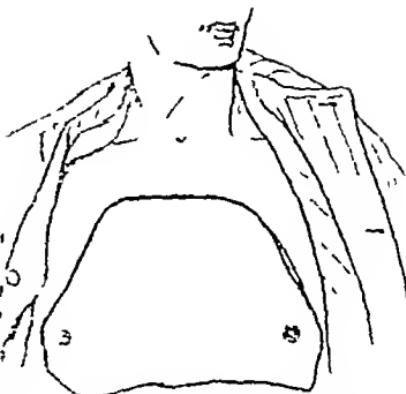


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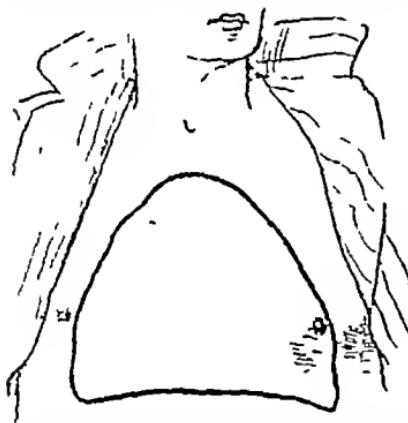


FIG 3.—Same case on 17th day after attack (April 21st) with first signs of absorption

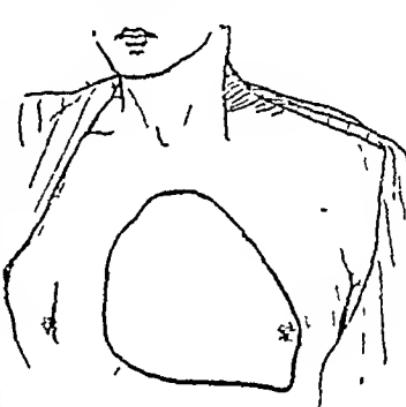


FIG 4.—Same on 24th day from first attack, slightly larger than normal, but, on turning over to left side, the dullness by A.P. rises to the nipple

This man had an obvious coronary thrombosis, affecting the heart in a vital position, yet for some hours by ordinary and by auscultatory-percussion only some dilatation in the region of the right auricle could be made out. Then in twenty-four hours by auscultatory-percussion an enlargement to the right is found which apparently increases daily, comes to a maximum in about a week, and for another week remains about the same, then these signs gradually decrease, but it has taken five weeks from the onset

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heart's size When the enlargement is found it may be watched daily increasing for four to six days, and with the increase the distress diminishes and there is usually none at the maximum For the next ten days there seems no difference in the size, but after the fourteenth day there is usually a slow decrease and the normal heart may be percussed out at, or soon after, the three weeks It is very seldom that a rub is heard The interval between the attack and the finding of enlargement accounts for there being no fluid found in sudden death from coronary thrombosis Where death has occurred after the diagnosis of coronary thrombosis has been made from the finding of this enlargement, out of three cases only one partial autopsy was allowed Unfortunately the pericardium was torn in removing the front of the chest and a bloodstained fluid escaped and we cannot tell the exact quantity present But there have been other diseases in which with the same findings we have diagnosed hydropericardium, and we have been able to get a fair number of autopsies, and in every case the fluid has been present If the heart is percussed out by A-P on the cadaver in many instances the fluid has apparently disappeared But if the front of the chest is removed carefully so as not to nick or tear the pericardium, no easy matter in the rigid chests of the aged, on the front of the heart will be found a bulging which to the touch acts like quicksilver, which disappears on letting air into the sac, but on lifting the heart from its bed two to three ounces of fluid will be found We are convinced that it has been this amount that has given the signs found by A-P For with the heart alternately expanding and contracting the excess beyond the thin layer needed for lubrication must be thrown violently into the periphery of the sac and gradually distend it Where, in the per-

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before absolutely normal findings are obtained. Yet he is better in himself every day, and with the enlargement at the maximum the uneasiness in the chest is lost. An enlargement that increases with improvement in the patient's condition can be neither the heart itself nor anything embarrassing its action. Nothing but a protecting layer of fluid can fit in with these findings.

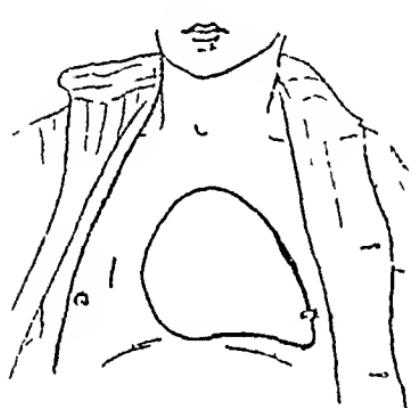


FIG. 5.—Same on 31st day from attack, slight decrease by A.P., but, on turning to left side, the dullness still rises slightly.

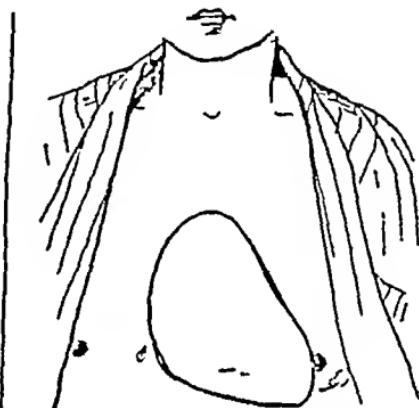


FIG. 6.—Same case on 38th day from attack, findings by A.P. practically normal without rise of dullness on turning to left side.

This case is an extreme one and has been used as an illustration, because there can be no doubt of what happened to the heart, a blocking of the circulation which upset the whole nervous mechanism. The circulatory block makes its way to the surface, sets up a roughening there and produces the reaction of a protecting fluid after an interval. Such an extreme case is comparatively rare, but slighter ones which occur in less dangerous areas are very common, yet in these slighter cases the phenomena found by auscultatory-percussion do not vary from those shown in the case illustrated. Something happens producing more or less distress to the patient, this distress may get a little better, but is still continuous, and for some hours no change can be found in the

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heart's size. When the enlargement is found it may be watched daily increasing for four to six days, and with the increase the distress diminishes and there is usually none at the maximum. For the next ten days there seems no difference in the size, but after the fourteenth day there is usually a slow decrease and the normal heart may be percussed out at, or soon after, the three weeks. It is very seldom that a rub is heard. The interval between the attack and the finding of enlargement accounts for there being no fluid found in sudden death from coronary thrombosis. Where death has occurred after the diagnosis of coronary thrombosis has been made from the finding of this enlargement, out of three cases only one partial autopsy was allowed. Unfortunately the pericardium was torn in removing the front of the chest and a bloodstained fluid escaped and we cannot tell the exact quantity present. But there have been other diseases in which with the same findings we have diagnosed hydropericardium, and we have been able to get a fair number of autopsies, and in every case the fluid has been present. If the heart is percussed out by A-P on the cadaver in many instances the fluid has apparently disappeared. But if the front of the chest is removed carefully so as not to nick or tear the pericardium, no easy matter in the rigid chests of the aged, on the front of the heart will be found a bulging which to the touch acts like quicksilver, which disappears on letting air into the sac, but on lifting the heart from its bed two to three ounces of fluid will be found. We are convinced that it has been this amount that has given the signs found by A-P. For with the heart alternately expanding and contracting the excess beyond the thin layer needed for lubrication must be thrown violently into the periphery of the sac and gradually distend it. Where, in the per-

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cussion of the cadaver, the enlargement is found as it was in life, the fluid in the pericardium will be seen surrounding as well as over the heart, and is greater in quantity.

Attacks in which A-P gives findings such as have been illustrated, and which we believe to be occlusion of some part of the coronary artery, we have found very common, rare before sixty, but probably increasing in frequency with each year of life afterwards, in fact, the state of semi-coma which often precedes death in extreme old age may be due to this cause, since the two are found together, and may be recovered from, the lethargy decreasing with the cardiac enlargement

The attack usually comes on suddenly and very often during sleep, seldom with exertion, as opposed to true angina. Others complain of increasing distress made worse by exertion, and cannot fix an exact onset. They all want to sit up. Flatulence that cannot be moved and seems to choke them, pain around the diaphragm, or at the heart's apex, or across the transverse colon are common complaints, less frequently, clutching anginoid pain across the chest, and still less frequently up to the shoulders or down the arms. Another form begins with a sudden breathlessness or difficulty in breathing during the night. There is always the first greater or less distress lasting a variable time which becomes a more chronic discomfort of which there is always consciousness and which is made worse by exertion, but this decreases as the fluid reaches its zenith. Men are more frequently affected than women, and it may occur in those who have had true angina, in fact, the prolongation of the pain sends them for treatment.

The diagnoses therefore rest upon this continuing cardiac distress which may simulate stomach or gall-bladder trouble, with a cardiac enlargement to the right, found by A-P, which, if found early enough,

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increases under observation, and, as a corollary to this, it is important to remember that no enlargement will be found immediately and may not show itself during the first twelve hours.

The general practitioner is seeing these cases in the mild form frequently and, if seen at the beginning of the attack, there may be no possibility of making the correct diagnosis, but the probability in persons over sixty should be remembered, for on the next day the fluid may be present and the correct diagnosis made.

The blood-pressure is always lowered, but with complete recovery this returns to normal, the results in the illustrated case are very general. A few are left with myocardial weakness, especially with an original high blood-pressure, and the cases superadded to true angina seem to have more frequent attacks of the angina afterwards, whether this is true or psychological from extra anxiety we are not sure. But the majority seem to get well and be no worse for the adventure, the older ones get second or more attacks at a few months' interval, we have seen second attacks before the first one has cleared away and the patient yet able to get back to work. On the other hand, as has been said, we have had in eighteen months three attacks which have been fatal, at intervals of thirty-six hours to ten days from the attack, and all were resting in bed. Our rule, therefore, is to give a very favourable prognosis to the patient, but a more guarded one to the relations. That the favourable one to the patient is fair is shown by the results of post-mortem examinations, for G. A. Allan¹ has shown from post-mortem records the large number that have recovered.

Ordinary percussion, when the fluid is at the maximum, does, we think, show an enlargement of the heart's dullness, and even with care an obliquity outwards on the right side seems to be present. But

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a course of iodide is generally given at intervals after the attack Nitroglycerine and vaso-dilators are of no benefit, here again showing its opposition to true angina

X-rays have given no evidence of the presence of fluid, even in two examinations of the same heart, first when the signs were present by A-P and secondly after recovery In the first films the heart shadow was larger than the second, but we are told the enlargement is chiefly on the left side and is dilatation But since pleuritic fluid is not always easy to detect by this means, the thinner layer in the pericardium could hardly be expected to give a shadow

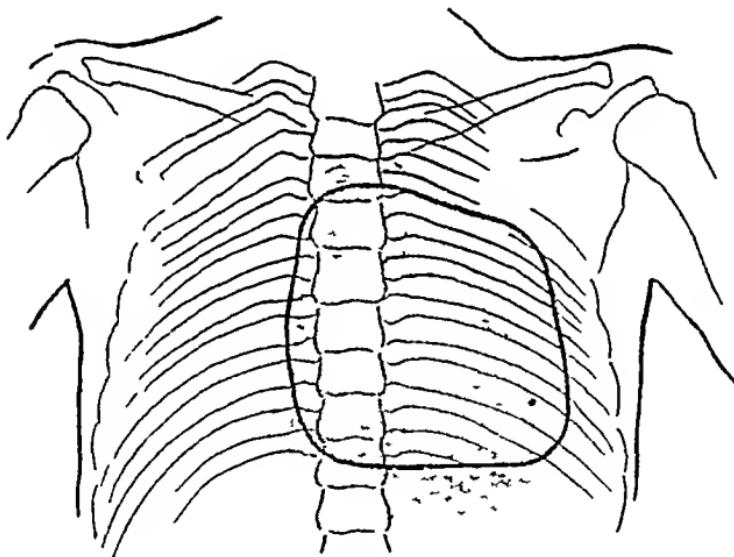


FIG 7

But if X-rays have not given evidence of fluid, they do give a hint on which to found a theory of the exaggerated findings shown by A-P A normal heart was mapped out by A-P, marked with wire held in place by strapping and X-rayed (Fig 7) So far as the right border of the heart is concerned the result is eminently satisfactory, but on the left side the result seemed a subject for either laughter or tears It will be noticed that there is a slight error at the apex

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most observers tell us they would call it only a slight dilatation. Probably there is this factor present, though in a subsequent paper we hope to show that the signs of simple enlargement given by A-P are very different from those of fluid. But experimenting with the fact that pericardial fluid is of a lower specific gravity than the heart itself, we have lately found a sign by ordinary percussion which has been agreed to by everyone to whom it has been shown. If the *normal* heart is percussed out and the right or left side of the dullness found be marked on the skin, and the patient then be turned on the opposite side to that marked, the dullness will now be found to have dropped with the movement, a small amount, but quite definitely. On the other hand, if fluid is present in the pericardium, after the same manœuvres, the dullness will rise a finger's breadth away from the movement. While those not already conversant with A-P may find this sign helpful, they will eventually come to agree with us in looking on it as a confirmation of what has already been found by auscultatory-percussion.

TREATMENT

Rest is essential, and these cases are always kept in bed until we are convinced the fluid is well on the way in absorption, *i.e.*, till after the first fortnight, then sitting up in the bedroom seems not to hinder further progress. They get back to increasing exercise when the sign of turning on the left side shows the absence of fluid. Then by the reaction to exercise and the return of blood-pressure, the condition of the myocardium can be found.

In the way of drugs, we have invariably given opium, at regular intervals, 5-10 minims four-hourly according to the severity of the discomfort, as this decreases, the opium is diminished and pot iodide added. Since arteriosclerosis is the underlying factor,

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With this theory in our minds we have experimented with all sorts of percussion and we do not think it can be anything but the truth. Fig. 8 is a photograph of a cross section of the chest at the nipple line from the Cambridge Anatomical Museum. Unfortunately the section is pathological, being the subject of a pleuritic effusion, but the heart is in a sufficiently normal position. As it shows the right nipple it gives the exact spot we want, and it will be seen that the line drawn at this point at right angles to the tangent of the curve misses the heart by very little and hits the vertebra on its front side, and imagining a slight distension of the pericardium the distension must be hit. On the right hand, therefore, A-P can be considered as comparable to the pointer with the long arm, we know it is an exaggeration, but it is an exaggeration of a fact. But we trust that the explanation, which seems a probable one, will remove the last doubts as to the reliability of the findings given by auscultatory-percussion.

As we have hinted, it is not only in coronary thrombosis that this symptom of hydropericardium has been found. But further notes on its presence in other diseases, and a comparison of the findings by auscultatory-percussion³ in acute pericarditis and simple cardiac enlargement, we hope to continue in a later communication.

We trust, however, we have given enough evidence on which a confirmation or denial of our findings of the pericardial fluid may be established by more competent observers, both clinical and pathological.

References.

¹ Allan, G A—"Coronary Thrombosis" *Brit. Med. Journ.*, 1928, ii, 232

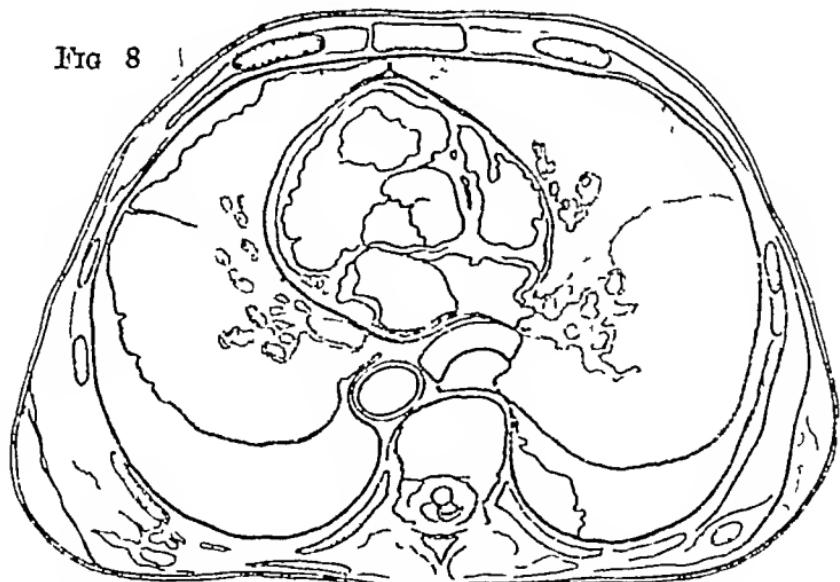
² Roberts, F T—"System of Medicine" (Allbutt), 1890, Vol v p 743

³ Grove, W R—"Diagnosis of Coronary Thrombosis" *Brit. Med. Journ.*, 1928, ii, 466

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and that this error is increased upwards to the third rib. The tube having been only 26 in. from the chest accounts for some of this, in that the chest wall is nearer to the source of light than the heart so that the nearer point will be thrown further out in the shadow, but this explanation cannot account for the increase of the error upwards. The chest was gone over again and A-P did not show any variation. But it was noticed that the curve of the chest increases from below upwards. Looked at from the front it is not very apparent, because it is flattened out by the pectorales. The actual chest wall as the ribs get smaller increases the curve considerably, and the thought was forced upon us that the fairly correct findings on the right and along the diaphragm, with the error beginning at the apex and increasing upwards on the right, might be explained by the curve of the wall, and we tried out the theory that the sound of percussion does not enter the chest at right angles to the sternum at all points, but at right angles to the tangent of the curve at the point of percussion

FIG 8



TREATMENT OF DIABETES

and is frequently above the normal concentration. The more severe the case the wider are the variations.

It has been taught that the ideal condition in the diabetic is that in which the sugar concentration never exceeds the normal maximum, this can be achieved by keeping the glycogen stores empty, and in a severe case only in this way, a condition in which the depleted patient suffers from languor and depression. Physical and mental vigour, which are the accompaniment of well-fed tissues, cannot be experienced when the patient is required to live for his energy supplies from hand to mouth, or from one meal to the next, with no reserves to draw from in the interval. Reserves are accumulated slowly as soon as the patient is given a diet with slight excess over the daily requirements, at first, while the reserve is still below normal, blood-sugar remains low and glycosuria is absent for the whole twenty-four hours, and the patient appears to be in a condition of metabolic balance, but as the reserves accumulate and a more normal state of nutrition is approached, glycogen becomes available for mobilization when tissue energy is required, and this leads again to high blood-sugars and intermittent glycosuria. A break in the diet is suspected or a deterioration in the pancreatic condition, though neither is, in fact, the cause, and the patient is at this stage feeling much better than in his earlier under-nourished condition. The desire of the patient is not merely to be kept alive, but to carry on an active life, and the aim of treatment must be to secure a contented energetic patient rather than one whose blood-sugar may be found normal at all times and whose urine is above reproach.

DIET TREATMENT

The treatment of acute diabetes in pre-insulin days was inevitably that of permanent under-nutrition

Notes on the Treatment of Diabetes in General Practice.

By D C HARE, CBE, MD, MRCP
Physician to the Royal Free Hospital

THE discovery of improved methods of diagnosis and treatment has brought diabetes into the category of chronic diseases which should be faced optimistically by doctor and patient, for though the diabetic régime is a hard one yet, speaking generally, it is not incompatible with a life of mental and physical vigour. The first condition of success is to obtain the patient's confidence and intelligent co-operation, for he will have to regulate his habits according to rule for the rest of his days. The treatment of diabetes may relieve symptoms completely without improving the pancreatic function or permitting of any relaxation of the régime; the natural instinct is to believe that "feeling well" is the same thing as "being well," which for the average person means abandoning all precautions. This in the diabetic leads rapidly to complete relapse.

METABOLIC BALANCE IN THE DIABETIC

The diabetic never has a perfectly balanced metabolism, no matter how carefully the treatment may be regulated. In practice a condition of balance is approached when the urine remains free from sugar on a fixed diet (with insulin if necessary), which is sufficient to satisfy the normal appetite and to maintain a normal bodyweight. The study of such a case by chemical tests of the blood shows, however, that the blood-sugar is more variable than in the normal,

TREATMENT OF DIABETES

and is frequently above the normal concentration. The more severe the case the wider are the variations.

It has been taught that the ideal condition in the diabetic is that in which the sugar concentration never exceeds the normal maximum, this can be achieved by keeping the glycogen stores empty, and in a severe case only in this way, a condition in which the depleted patient suffers from languor and depression. Physical and mental vigour, which are the accompaniment of well-fed tissues, cannot be experienced when the patient is required to live for his energy supplies from hand to mouth, or from one meal to the next, with no reserves to draw from in the interval. Reserves are accumulated slowly as soon as the patient is given a diet with slight excess over the daily requirements, at first, while the reserve is still below normal, blood-sugar remains low and glycosuria is absent for the whole twenty-four hours, and the patient appears to be in a condition of metabolic balance, but as the reserves accumulate and a more normal state of nutrition is approached, glycogen becomes available for mobilization when tissue energy is required, and this leads again to high blood-sugars and intermittent glycosuria. A break in the diet is suspected or a deterioration in the pancreatic condition, though neither is, in fact, the cause, and the patient is at this stage feeling much better than in his earlier under-nourished condition. The desire of the patient is not merely to be kept alive, but to carry on an active life, and the aim of treatment must be to secure a contented energetic patient rather than one whose blood-sugar may be found normal at all times and whose urine is above reproach.

DIET TREATMENT

The treatment of acute diabetes in pre-insulin days was inevitably that of permanent under-nutrition

preceded by fasting, often prolonged for two to three days, till the urine was sugar-free, when a "ladder diet" followed under the scheme introduced by Allen. This treatment should not longer be employed for the severe case already under normal weight, as it only prolongs the period of invalidity. A normal nutrition or "maintenance diet" should be given from the first, *i.e.*, a diet calculated to maintain the normal bodyweight in health; when at rest a low diet only is required, say ten calories to the pound of bodyweight, and as activity increases the allowance must be raised gradually. The proportions of the three food constituents, carbohydrate, protein and fat are calculated and given in sufficient amount to produce the total calorific value required; the values may be obtained from published tables—those by Harrison and Lawrence¹ are convenient for general use. After a few days, if glycosuria is still present, insulin is given.

The detailed regulation of diet will not be described here, there are many good books on the subject^{2 3}. The need for variety should not be forgotten, it is inhumane to condemn the patient to eat the same food daily. It should be remembered that the nutritional values vary widely, first in the food as bought, secondly as cooked, and thirdly as absorbed in the stomach and intestines. After the initial stages of treatment the patient should be given a list of foods forbidden and foods allowed and be taught to choose a varied diet of approximately correct values; this can be checked occasionally by obtaining a record of the actual menus for a week with the weight of food taken.

THE WEEKLY WEIGHT RECORD

This is an important means of studying progress and the results of treatment, patients who are above or below the desired weight should lose or gain

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accordingly, and diet and insulin are adjusted to this end.

TESTING THE URINE.

Tests for sugar and acetone should be made daily when treatment is being begun, when any change of treatment is being introduced and when infection or other illness occurs. When treatment is established the sugar test should be made weekly on a mixed sample of urine, if possible on a complete twenty-four hours collection. All intelligent patients should be taught to do the sugar test and to use the results to regulate their diet and insulin dose within prescribed limits, they can thus detect if anything is going wrong and a lapse from diet rules will bring a reminder and a check.

INSULIN TREATMENT

The supply of insulin given hypodermically twice or thrice daily cannot replace the normal mechanism of secretion by the regulation of the blood supply to the gland. Insulin by injection is supplied to deal with absorption of alimentary carbohydrate taken in at a known time, but when the tissue sugar rises as the result of the mobilization of the glycogen reserves, insufficient insulin may be available to metabolize it and an excessive rise and temporary glycosuria cannot be avoided. At another time, heavy exercise following a large dose of insulin may produce a temporary hypoglycæmia which does not occur with moderate activity. Experience has shown, however, that in practice the adjustment of the dosage is not difficult in adult cases. The easiest way of initiating the treatment is to begin with a moderate dose and increase it rapidly or slowly according to the needs of the case while keeping the diet constant, when the patient's "balance" is being worked out, changes in both diet and insulin dose

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should not be made simultaneously. In the averagely severe case insulin may be begun with a dose of 10 units twice daily increasing every forty-eight hours by 10 units daily till a dose of 50 units daily is given. This is an average maximum dose, and although the diet may not be quite balanced it will be well to pause before making a further advance; a reduction in the carbohydrate allowance may be necessary to secure the required result. Doses of 25 units at a time should seldom be exceeded, and a large evening dose should be avoided.

The reaction to insulin can be watched with some accuracy by means of urine tests while glycosuria is still present. The effect in lowering the blood-sugar and the sugar output begins about a quarter to half an hour after the dose and reaches a maximum from two to four hours after. If the dose is not enough to lower the blood-sugar below the "renal threshold for sugar," i.e., the concentration at which sugar passes out of the blood into the urine, the urine secreted will contain sugar and the dose can safely and with advantage be increased. To carry out the test, separate urine specimens are collected, the bladder should be emptied about a quarter of an hour after the injection (thus specimen will probably contain sugar) and at two-hourly intervals. The specimens at two and four hours after the injection and meal are those which will probably be sugar-free, the time of return of urine sugar can be noted and another insulin dose introduced or the amount of the dose increased. When glycosuria is only occasional or apparently absent, a total twenty-four-hour collection should be made and tested, and if sugar is found, the time at which the "leak" occurs can be traced by the examination of separate specimens, but, as explained above, it is usually impossible to keep the blood-sugar of the well-nourished severe diabetic continuously normal with two or even three

TREATMENT OF DIABETES

doses of insulin daily, and urine-sugar leaks occasionally occur and do not call necessarily for change in treatment.

Hypoglycæmia of slight degree occurs frequently in the course of treatment and need cause no anxiety. For evidence of slight attacks the patient's own account of his symptoms must be relied upon, and those who have been warned are sometimes over-anxious and relate suggestive symptoms due to other causes. Giddiness, "an all-gone feeling," "eyes coming over dark," sweating and trembling, when noted from two to four hours after insulin may be attributed to low blood-sugar concentration. It is particularly likely to develop after unusually heavy muscular exertion. The treatment is to lessen the insulin or increase the food or add a small amount of food at the time when symptoms are likely to develop. Patients on large doses should be taught to cut down the dose before undertaking heavy work. Severe hypoglycæmia need not be feared in an adult on an ordinary dose that has been gradually reached; it has occurred after the massive doses that are given in the treatment of diabetic coma. Fits and severe symptoms are produced sometimes in young children of three or four years on moderate doses, and may be difficult to avoid, as the blood-sugar levels vary widely under constant conditions from day to day, but with careful watching no harm results.

INSULIN AND CARBOHYDRATE BALANCE

There is no constant insulin-carbohydrate ratio which can be applied to the treatment of diabetes, the amount of carbohydrate which a unit of exogenous insulin will metabolize varies with the internal pancreatic and hepatic activity of the individual and the rate of absorption of the carbohydrate. When taken in a non-concentrated form in which absorption is slow, as

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sending patients for a test to the laboratory the clinician must know what particular point he wishes investigated, haphazard estimations on a patient who is taking a haphazard diet and passing an unknown amount of sugar, will give little information which cannot be obtained in other ways

Tests made under controlled conditions are valuable in certain cases —(1) For diagnosis, (2) for an estimation of the severity of the disease, (3) for guidance in treatment in respect of diet or insulin, (4) for estimating progress, (5) in ketosis. Fasting tests are usually made, unless for special reasons, and the preliminary fast may be from four hours to twelve hours (overnight), or for a longer period

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(2) *Tests for Estimating the Severity of the Disease* — In uncomplicated cases the test should be made after the patient has been under treatment by diet for a week or fortnight and is on a known carbohydrate intake and output as estimated in a daily urine collection. If glycosuria has been abolished by diet it may be discovered that the patient has a raised "renal threshold" for sugar, i.e., when the urine is sugar-free the blood-sugar is above the normal leak-point for sugar, 0.18 gm per cent. The urine should always be

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in green vegetables and fruits, the diabetic metabolism aided by exogenous insulin can deal with carbohydrate more efficiently than when the same calculated value is given in concentration, as in starches or sugars; in consequence, diet restrictions remain a fundamental part of the treatment and the carbohydrate is restricted both in total value and in the form in which it is taken. A high total diet with large insulin dosage in a severe case lead to excessive gain of weight due to deposits of fat, and in some cases to a condition resembling oedema, a loss of balance and a return of glycosuria follow. Young patients are particularly liable to this condition, which must be treated by a period of under-nutrition and reduction of insulin. Severe diabetics fattened under the influence of insulin may develop a fatal ketosis should they acquire a septic infection; it seems as though once their large stores of fat begin to break down into ketones no further treatment with insulin and carbohydrate will arrest the process

ADMINISTRATION OF INSULIN

Every patient who is not physically incapable should be required to give his own hypodermic injections. Dependence on a doctor, nurse or relative may lead to forced intermission of treatment at a critical time. Local reactions and infections are extremely rare in spite of imperfect technique. No preparation for oral administration has been found hitherto to replace the hypodermic administration

BLOOD-SUGAR ESTIMATIONS IN DIAGNOSIS AND TREATMENT

The blood-sugar concentration varies from hour to hour in relation to the taking of food, especially of carbohydrate, and also with exercise, this range of variation is far wider in the diabetic than in the normal, and must be kept clearly in mind. When

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(3) *Tests for Studying the Effect of a Single Dose of Insulin.*—These are sometimes required when the symptoms suggest hypoglycaemia.

(4) *Tests for Studying the General Course of the Disease.*—These may be made at intervals of a few months, but deterioration or improvement will usually be apparent in other ways.

(5) *In Ketosis.*—Tests are invaluable in cases with threatened or developed coma where massive doses of insulin must be given in quick succession. The treatment of coma is outside the scope of this paper.

CONCLUSION.

These notes embody the general lines of treatment adopted for patients attending the diabetic clinic or admitted to the wards of the Royal Free Hospital. Knowledge of the metabolism of diabetes is still very incomplete, and consequently opinions differ on many points connected with treatment, these differences must be settled in the light of future knowledge.

References.

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Spa Treatment.

By W BERTRAM WATSON, M D

*Honorary Physician, Home for Incurable and Chronic Diseases,
Harrogate*

MANY years ago the candidates for the M D London were asked to give a classification of the natural mineral waters of the world, together with any special knowledge they possessed of any particular spa, at the same time to discuss the value of spa treatment. At the *viva voce* examination, the late Sir Frederick Taylor, after perusing my answer, suggested that I did not appear to have much faith in the efficacy of spa treatment, and blandly inquired whether my faith was in proportion to my knowledge, to which I replied, "Then, indeed, Sir, my faith must be small" After twenty-five years active practice at a British spa, with increasing knowledge and experience has come increasing faith, and I am satisfied that in many types of disorder great benefit is derived by the use of natural methods and physical treatment

There are certain factors which underlie all forms of spa treatment —

(1) *A quantity of living spring water is taken into the system daily under regulated conditions* — The waters in different spas vary in temperature, and also in the saline, and gaseous substances dissolved in them. Their efficacy is not solely due to their fluid content, however important the "flushing" element may be, nor is it to be explained merely by the presence of certain salts as revealed by chemical analysis. Attention must be directed not only to what saline constituents are present, but also to the form in which

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classified baths broadly into four groups, namely—

- (1) Simple thermal baths.
- (2) Baths depending mainly on the chemical constituents of the water
- (3) Gaseous thermal baths.
- (4) Thermo-mechanical baths

The spa of to-day is furnished with a much more extensive equipment—Electrical treatments, high-frequency, ionization, diathermy, the Bergonié and Bristowe treatments are to be procured, heliotherapy is utilized freely. As far as general considerations are concerned, it cannot be denied that in balneotherapy we have a weapon capable of modifying metabolism profoundly. To take, for example, thermal baths; their fundamental effects may be shortly stated as equalizing and diminishing the loss of heat. They promote the flow of blood to the surface and so improve cutaneous circulation and stimulate tissue change. All the phenomena, both early and late, caused by immersion in a cold bath are due to the physical reaction against the stimulation of cold. The particular point which I wish to stress is the importance and influence of the skin on the loss of heat externally. The function of the skin consists not merely in promoting, but also in moderating the radiation of heat.

(3) *Climate*—Changes of climate are of immense value in improving the recuperative powers and general health. The important points for consideration in any climate are. (a) Pure air, free from pollution of dust and smoke, (b) Abundance of sunshine without undue heat, permitting open-air recreation and exercise, and (c) a climate suited to the individual; often what is required is the effect of contrast, for instance, the change from a warm to a cold climate. Climatic and atmospheric conditions are of the first importance as far as balneological treatment is concerned.

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they exist in the medicinal waters. It is possible that they may be completely ionized, and if this be so, it may explain the difference which is so commonly observed in the therapeutic effect of a natural mineral water and an artificially prepared water, having the same chemical composition. Many springs, and chiefly those of low mineralization, are radio-active at their source, and this may have an important bearing in determining their therapeutic effects.

Speaking broadly, the objects of a course of waters taken internally are as follows :—

(a) To remove from the alimentary canal products of imperfect digestion, to stimulate the liver, to get rid of waste products by the blood stream, with subsequent elimination by the skin and kidneys—in short, to “wash-out” the tissues.

(b) To promote what was called by older writers the “alterative” effects of a course of waters. The main principle underlying all forms of treatment of chronic disorders is the promotion of a healthy reaction of the affected tissues—the stimulation of a reaction which presumably is inadequate. It is in the promotion of this “alterative” reaction that spa treatment by means of baths and waters finds its application.

Whatever are the clinical characteristics of the medicinal spring waters administered, indifferent thermal or mixed chloride, sulphur or alkaline, chalybeate or arsenical, the *raison d'être* of the treatment can be expressed in two words “excretion” and “elimination”. Apart from the eliminatory action of the water, the presence of chemical constituents, varying in quality and character at different springs, imparts other therapeutic qualities; some are purgative, others diuretic, a further group act as cholagogues, and so on.

(2) *Balneotherapy*.—In an article I wrote some years ago for a dictionary of practical medicine, I

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is merely an adjunct of distinct, though limited, value. The other factors to which I have alluded, what may be expressed as the "health resort" rather than the "spa" idea, are valuable aids to treatment, hydro-therapeutic methods in many instances occupying a secondary place. A well-equipped spa is a place for the investigation as well as for the treatment of disease. It has its laboratories for biochemical and bacteriological investigation, and facilities for X-ray diagnosis and therapy.

I will now deal in turn with some of the types of diseases most suitable for spa treatment, at the same time attempting to indicate some of the advantages of spa treatment over other methods in these diseases. From what I have said regarding the underlying principles it is obvious there are many disorders of the liver and of the gastro-intestinal tract which respond favourably to spa treatment. These include functional hepatic disorders, early cirrhosis of the liver, cholecystitis, intestinal toxæmia, colitis and chronic diarrhoea. High colonic irrigation is a valuable therapeutic measure and it is always a surprise to me that it is prescribed so little save in London and in our spas. Then again, we see a large number of patients suffering from nervous disorders—neurasthenia, overwork, fatigue. The rest, with change of air and scene and the removal from home surroundings and business worries, all form important adjuncts to the various forms of balneotherapy employed.

Rheumatism.—The report of the Ministry of Health on the incidence of rheumatic diseases, published in 1924, states that 370,000 insured persons seek advice for one or other forms of rheumatic disease each year. In males these conditions are responsible for exactly one-sixth of the total sick absence from all causes. One-seventh of the total sick benefit, or nearly £2,000,000 is paid away annually to the

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cerned. It has often been observed that the reaction of a patient to a particular bath, similar in every respect, varies markedly at different spas, the responsible factor being the climatic one.

(4) *Regulation of Mode of Life and Diet*.—Those of us who practise at spas are much impressed with the amenability of patients. They come prepared in their minds to undertake a particular course or cure, and expect a certain amount of routine in treatment. Crowd psychology is an important element in this; the fact that "everybody is doing it" is a great asset to the physician at the health resort and one of the great advantages of treatment at a spa over treatment at home. The patient finds it much easier to alter his habits and diet. Early to bed and early to rise is the order of the day, regular diet and regular meal times replace late hours, over-indulgence in food and alcohol, and meals taken at varying hours of the day.

(5) *Psychical Influences*.—The importance of the psychical factor cannot be overestimated in the treatment of chronic diseases. A patient at a spa is made as cheerful as possible, and everything is done to divert his mind from thinking "in a circle" of his ailment. Healthy mental influences, change of occupation and recreation are recognized psychical tonics, and the benefit to health of a course of treatment at a spa is often in part psychical, due to change of mental occupation.

(6) *Accessory Spa Treatment*.—Twenty years ago it was the fashion for patients visiting spas to have hydro-therapeutic treatment only. The spa physician prescribed for every patient a course of spa treatment, and was inclined to think his duties began and ended there, the result being a markedly limited view-point. Now, to many of us, hydrological treatment—and by that I mean the administration of waters and baths—

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insured population in respect of invalidity from these diseases and over 3,000,000 weeks of work are lost in consequence. The value of physical treatment of rheumatic conditions is recognized more on the Continent than in England, but things are beginning to move here. There are many varieties of diseases included under the general term "rheumatism," and in considering which types are suitable for spa treatment I cannot do better than follow the classification and treatment advised in a memorandum by Dr. M. B. Ray, Secretary of the London Clinic Sub-Committee on Rheumatism :—

(1) Acute forms which confine the patient to bed —
(a) Rheumatic fever; (b) acute rheumatoid arthritis;
(c) the more acute forms of inflammation of fibrous tissues. With these the clinic would not deal—it is an ambulatorium, not a hospital. The patients must be able to walk or be fit to be brought to it

(2) Subacute forms :—(a) In the soft tissues—lumbago, sciatica, fibrositis. (b) in the joints (arthritis) and periarticular tissues.

(3) Mechanical impediments which follow acute or subacute attacks; or disability due to accident or injury.

In general, the treatment of rheumatism is as follows. The patient has at each visit two or more of the following methods applied in succession, and this combined treatment is continued usually three times in the week for from two to four weeks, slight cases requiring only brief treatment. These physical methods do not necessarily exclude other forms of medical or surgical treatment :—

(1) Heat and cold and movement :—In water, vapour and hot air locally and generally applied

(2) Manipulation and exercises, alone or in combination with heat by the hand or by douches or whirling water.

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(3) Radiation—as heat, light, and invisible rays (ultra-violet and infra-red) from arc or mercury vapour or other lamps

(4) Electricity—as constant current to resolve exudations and promote nutrition; as interrupted current to cause movement of muscle fibres; and as high-frequency current (diathermy) to raise the temperature of deep-seated parts. Like many drugs, physical remedies can have either a sedative or stimulant action, according to the way in which they are employed

Subacute cases require warm application of water or vapour and gentle manipulation. There are sedative remedies; they relieve pain and allay congestion and nervous and circulatory excitement. Chronic cases require brief and intensive application of heat, with strong manipulation. These are stimulant remedies. By causing active hyperæmia and increasing the circulation of blood and lymph and the local nutrition they help to remove the effects of former disease or injury. They act also powerfully on and through the skin, and indirectly on the nerve centres and general nutrition, by stimulating elimination and metabolism. Cold douches and sprays are also used as stimulants to the nerve centres and metabolism.

Metabolic Disorders—Large numbers of patients suffering from gout in its various manifestations frequent the different spas. The treatment used in these cases is both internal and external. The natural mineral waters are administered at stated times throughout the day. Baths, massage, douches, etc., are of marked service in the treatment of gouty deposits, and gouty inflammation involving the joints and tendons. I am not at present concerned with the question of the pathogenesis of gout—the views on which are still so conflicting—but it may be taken as a clinical fact that spa treatment in this type of case is

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oftentimes followed by marked benefit.

Skin Diseases.—Practising at a spa which has built up its reputation because of the presence of sulphur waters, my attention has naturally been specially directed to the value of spa treatment in diseases of the skin. It must always be remembered that many cutaneous disorders occur as the direct or indirect result of a large number of constitutional and visceral diseases. Diseases of the liver, kidneys, the gastro-intestinal tract, nervous system, rheumatism, gout, diabetes, are frequently accompanied by cutaneous disturbances. The first principle of successful treatment of the skin disorder is to deal with the internal disease with which it is associated. Oftentimes it is difficult and even impossible to trace the relationship, but with many conditions it is readily understandable and demonstrable. For example, we are justified in assuming that pruritus or eczema occurring in a patient suffering from chronic interstitial nephritis is due to defective elimination by the diseased kidneys, their excreting function being damaged. The occurrence of carbuncles, furuncles and other staphylococcal skin infections in the diabetic is to be explained by the saturation of the skin with sugar, thus rendering it a favourable nidus for the growth of micro-organisms. But there remains a large field about which we are lacking in exact information concerning the precise relationship between constitutional and cutaneous disorders, although we are sure, from clinical observation and from the effects of treatment, that a close relationship exists. Take, for example, the intimate relationship between gastro-intestinal disorders and skin diseases. Some forms of eczema, pruritus, urticaria, some types of acne, are conditions frequently observed in association with, and influenced by, diseases of the stomach and intestines. Pruritus is connected with diseases of the liver, especially when

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jaundice is present, and xanthoma and chronic jaundice are often associated. The connection between gout, both inherited and acquired, and eczema is well established. Many dermatologists have drawn attention to the association between psoriasis and chronic arthritis.

There is evidence to show that sulphur is excreted through the skin while the sulphur waters are being taken. The beneficial effects of sulphur waters in many skin diseases may be in part explained in this manner. In addition to the administration of waters, it is my custom frequently to prescribe a course of intestinal lavage. An alkaline sulphur water is used for this purpose, which is hypertonic with respect to liquor sanguinis. The cleansing of the large intestine and the bathing of the mucous membrane thereof is a procedure of the greatest value in the treatment of chronic eczema and other skin disorders. You must all have seen many examples of chronic eczema in which the application of water, and particularly of hard water, is definitely injurious, macerating the delicate epidermis unprotected by the proper resistant horny layer, and it is on this account that soft water, such as rain water, is often prescribed.

Soft alkaline water, such as the Harlow Car Spring at Harrogate, a feebly mineralized water in which the carbonates of the alkaline earths predominate, is a soothing bath for the skin, and probably mildly antiseptic owing to its sulphur element. Great care is required, however, in cases of chronic eczema, in the prescribing of any form of bath treatment.

The temperature at which the bath is administered and the duration of immersion are points of great importance. Bath treatment affords an agreeable form of treatment to the patient. It is a ready method of making the surface clean, removing all secondary products, crust and scales, and so

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increasing the therapeutic efficacy of any ointment or other form of external application subsequently used. The nutrition of the skin is improved owing to the increased circulation, and there is a tonic and sedative effect on the cutaneous nerves. For chronic eczema of an infiltrated type, in which it is desired to promote a reaction, either mild or strong, or natural sulphur immersion baths may be used. In actual practice, however, it is necessary to proceed very gently, undertreating rather than overtreating, as there is a real danger of lighting up a chronic quiescent condition into an acute inflammatory state. From my experience, cases of acute or subacute eczema should have no form of bath treatment whatsoever at Harrogate, and if the case be on the border line between subacute and chronic, it is always wise at any rate to postpone bath treatment. Sweating baths are sometimes prescribed in some chronic forms, but I have seen them more frequently do harm than good, and have ceased to prescribe them.

Of the sulphur spas in Great Britain, Strathpeffer enjoys a reputation for the cure of chronic forms of eczema, which is well deserved. As at Harrogate, chronic eczema, associated with alimentary toxæmia and gout, is the type which responds well to treatment at this highland spa. Llandrindod Wells, in Radnorshire, has a sulphurated saline, non-thermal water, having marked diuretic properties. This is used both for drinking and for bathing, and is of service in the treatment of chronic eczema.

Largely as the result of the work of Unna and Sabouraud, the generally accepted view now is that *seborrhœa* and *seborrhœic eczema* conditions are due to microbial infection (Sabouraud's micro-bacillus) and other micro-organisms, for example, the *Staphylococcus aureus*. In many cases of seborrhœa, chlorosis, constipation and other digestive disturbances appear

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to have a strong predisposing influence; consequently the condition is oftentimes improved by a course of sulphur water followed by the drinking of an iron containing water. Strong sulphur baths are of service on account of their antiseptic effect. Further, they keep the skin free from oiliness and crusts. In seborrhœic eczema, one of the milder sulphur waters may be used for bathing purposes. In cases of seborrhœa with little or no eczema, sweat baths with shampooing to follow, massage baths—for example, the Vichy douche and Scotch douche—are of service as cutaneous tonics *via* the nervous system.

The commonest of all forms of skin diseases is *acne vulgaris*, and, in my experience, it responds most readily to spa treatment. Open-air exercise, stimulating baths, free intestinal elimination, the drinking of a natural mineral water, either of the sulphur or iron group or both, and, of course, a carefully regulated diet, are all measures of the highest importance. If the condition be confined to the face, prolonged spraying—pulverization as the French call it—with a sulphur water at a temperature of 108° F. to 110° F. tends to render the skin aseptic and greatly reduces the seborrhœa, the foundation of all forms of acne. For acne on the trunk hot sulphur immersion baths may be utilized.

The cases of *psoriasis* which do best with spa treatment are those in which the eruption is widespread over the body, and neither progressive nor hyperæmic. A course of alkaline sulphur immersion baths—for example, at the Harlow Car Spring, Harrogate—frequently causes a widespread psoriasis to disappear. Prolonged soaking is usually necessary, from one to one and a half hours, and if the bath be taken at an indifferent temperature, it does not in the least weaken the patient. The semi-solid peat baths of the British spas are similar in therapeutic action to the mud baths.

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or Strathpeffer is indicated. For cases of intractable pruritus connected with an atrophic condition of the skin due to senile change a warm, dry climate is indicated, and a course of thermal baths in the summer months at spas such as Buxton

(3) *Circulatory Disorders*.—In the textbooks on and reports from various spas, and particularly those in Germany and Austria, much space is devoted to the consideration of the treatment of cases of arterial hypertension by hydrotherapy. One reads of the effects of baths at different temperatures on the peripheral circulation and is told that certain forms of baths reduce, others elevate the blood-pressure. I wish, however, to sound a note of warning. Arteriosclerosis is a permanent change and incurable, and there is considerable danger in over-treating these patients at our spas. When the arteriosclerotic changes are associated with degenerative changes in the heart or kidneys, spa treatment is contraindicated. Particularly dangerous is the treatment by means of baths and waters of the elderly male patient with arteriosclerosis and an enlarged prostate.

There is, however, a pre-sclerotic stage in which arterial hypertension is present with no demonstrable evidence of the presence of either a renal or a cardiac lesion. The patient has a moderately elevated blood-pressure—systolic 160-170 mm. Hg leads a sedentary life, is inclined to over-eat and is the subject of auto-intoxication. It is probable that toxic substances resulting from abnormal protein metabolism are responsible for the arterial hypertension. Such cases oftentimes respond well to a carefully directed course of hydrotherapy, including intestinal irrigation.

of Acqui and other Continental spas, and act as large poultices to the surfaces of the body. At Harrogate, these baths are composed of peat from the neighbouring moors, thoroughly mixed, in a mechanical mixer, with sulphur water. Clinically, it is found that they have a definite therapeutic effect in psoriasis.

Another group of cases which are sent to spas and respond favourably to spa treatment are patients suffering from chronic *urticaria*. Such cases require the most complete and careful examination if the underlying factor or factors are to be discovered. Over-eating, intestinal stasis, defective elimination are the most important factors in the aetiology of chronic urticaria conditions which, as I have already mentioned, are peculiarly appropriate for spa therapy. Of all forms of spa treatment, high colonic irrigation has, in my hands, proved the most efficacious, and the concurrent administration of an autogenous vaccine is frequently useful. Baths, for example alkaline sulphur baths, are of great benefit in some cases. The patient should remain in the bath for from fifteen to twenty minutes, at a temperature of 100° F. to 104° F., so that there is no feeling of chilliness. Nauheim baths, massage and needle baths, have their place in toning up the general health, and modifying the vasomotor instability underlying the condition.

Some troublesome cases of *pruritus* are amenable to spa treatment. The affection is primarily a functional disturbance of the nerves of the skin, a sensory neurosis. The most common factors to be considered in a more or less generalized pruritus are digestive and intestinal arrangements, hepatic disorders, and the underlying constitutional state must be carefully considered and appropriately treated. In plethoric individuals, in whom the hepatic functions are presumed to be at fault, a course of waters at Harrogate

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The Treatment of Mixed Parotid Tumour.

M Lenormant reports a case of mixed parotid tumour which was operated upon and was found difficult to remove, as is frequent in these cases. A recurrence took place in one month after the operation, and radium was then applied in massive doses. Fifteen months later the tumour had disappeared completely and there was no return, the only sign of trouble was a slight degree of facial paralysis, owing to the involvement of certain branches of the facial nerve in the tumour—(*Journal des Praticiens*, July 20, 1929, p 480)

Failure in the Removal of Stones in the Biliary Tract.

E L Young, junr, has made a study of all the cases autopsied at the Massachusetts General Hospital in which there had been an operation on the biliary tract. He found that, following operations on the biliary tract where calculi were present, the percentage of failure in the removal of these stones was from 16 4 to 61 3 per cent, depending on the optimism or the viewpoint of the surgeon. He concludes that in those cases which, because of good general condition, allow time to do everything necessary, the common bile duct should be opened and explored where there is any reason at all for believing there may be stones. The absence of jaundice should never prevent thorough exploration of the common and hepatic ducts. The recurrence of symptoms following operation may often be due to the passage of small concretions or fragments left behind—(*New England Journal of Medicine*, May 30, 1929, p 1,145)

The Injection Treatment of Varicose Veins.

M B Cooperman employs, in the injection treatment of varicose veins, a solution of sodium salicylate in 30 per cent or 40 per cent concentration, the latter being used only in resistant cases. Sodium salicylate has the advantage of being mildly antiseptic and well tolerated by most patients, and is positive in its irritating action on the venous walls. The chief drawback to this drug is the intense cramp-like pain that occurs after the injection. To counteract this, free use of normal salt solution is resorted to and injected round the vein after each puncture. In Dr Cooperman's experience this lessens the local reaction considerably and makes the treatment more tolerable. It cannot be asserted, however, that this injection method of treatment is capable of curing all cases, there are types of varicosities which are resistant to this treatment. Nor are recurrences exceptional, but they are less frequent than after the surgical treatment of varicose veins—(*Medical Journal and Record* [New York], May 15, 1929, p 541)

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Practical Notes.

The Treatment of Cancer of the Fundus of the Uterus.

L J Stacy points out that the post-operative results in cases of carcinoma of the fundus of the uterus have always been considered more encouraging than those following operation for malignant disease in other commonly affected organs. This is borne out by the series of cases studied by Dr Stacy at the Mayo Clinic. Of 333 patients, 288 were traced, and of these 184 (63.88 per cent) were alive more than five years after operation. Of 172 patients heard from who had been operated on ten years or more previously, 76 (44.18 per cent) were alive for ten years, and of 79 heard from who had been operated on fifteen years or more previously, 23 (29.11 per cent) lived for fifteen years. The good results in operations for carcinoma of the fundus of the uterus are probably due to the protection afforded by the uterine muscle, which renders the growth less accessible to the lymphatics and explains the fact that 70 per cent of the patients who died of malignancy had local recurrence rather than metastatic malignancy. Radium and X-rays have been used at the Mayo Clinic for only a small number of patients who were poor surgical risks, and the results have been poor. If radium is used in amounts sufficient to destroy the carcinoma, ulceration of the healthy endometrium occurs and the mucosa of the bladder may be affected also—(*Surgery, Gynecology and Obstetrics*, July, 1929, p 43.)

The Clinical Value of Sunlight through Ultra-Violet Transmitting Glass

G W Caldwell and R H Dennett published a report of a study of the clinical value of sunlight transmitted through certain window glass substitutes, which are designed particularly to transmit a portion of the solar ultra-violet rays of a wave-length known to be of definite therapeutic value and which are excluded when sunlight passes through the usual type of window glass. In order to investigate the efficiency of this particular glass, a solarium was built on the roof of the hospital, where children from the ward could be exposed regularly to the sunlight. It was found that there are ample ultra-violet rays in the antiraditic range in this latitude (New York) during the winter to be of definite value to those receiving them through this type of window glass when exposures are made in the direct path of the sun's rays, since enough of these rays penetrate the glass to prevent rickets and spasmophilia in a normal, properly fed infant. The authors state that it is unfortunate that so much has been said about solarization that the general impression has been gained that after the glass is aged there is no therapeutic effect. This is untrue—(*Journal of the American Medical Association*, June 22, 1929, p 2,088.)

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treatment of abdominal pains, especially the pains caused by adhesions. In a series of over 100 cases the authors had successful results as regards the relief of symptoms in over 37 per cent of cases, even in patients who had had several unsuccessful surgical operations for the condition. Only rarely was the treatment by diathermy badly tolerated by patients. It is suggested that the improvement was due rather to a decrease in congestion, following treatment than to actual reabsorption of the adhesions—(*Paris Medical*, April 20, 1920, p. 369.)

The Bronchoscopic Treatment of Asthma.

G Ewart Martin, in the course of a review of the bronchoscopic treatment of bronchiectasis and other chronic non tuberculous diseases of the chest, has some interesting remarks to make on bronchoscopy in asthma. Many cases of asthma were sent to the author for uncontaminated swabs from the trachea, as it was found that patients benefited by an autogenous vaccine taken from the subglottic regions, who had previously failed to respond to a vaccine from the pharynx or hypopharynx. In the examination of many of these cases it was found that the lining membrane of the trachea and bronchi, especially in the lower bronchi, was curiously oedematous and pale—rather similar in appearance to the condition of the lining membrane of the nose in certain conditions of asthma. The condition was therefore treated with a vaso constrictor, the best results being attained by the local application, by means of a bronchoscope, of an oily solution of ophedrine, to which was added adrenaline and cocaine—(*Edinburgh Medical Journal*, August, 1929, [Supplement], p. 153.)

The Physical Treatment of Heart Disease

E Plate is of opinion that the most important means which we possess for strengthening the heart muscle is the CO₂ brine bath. The advantage of this is that baths can be given in this form below the "indifferent temperature". This temperature varies with the individual, a point which must be particularly borne in mind, for a cool bath makes great demands on the heart. The exercising treatment is facilitated by forcing more CO₂ through the bath water. The small carbonic acid bubbles, like the brine in the water, stimulate the skin, so that the bather does not notice the low temperature. It has been ascertained by recent experiments that the skin does not excrete any CO₂ in these baths. The carbonic acid retained in the skin acts in a similar manner to protein bodies and fever, but the temperature sinks somewhat. An increase of metabolism has been demonstrated, to which is ascribed the favourable action on the heart. The technique of the bath is important. One commences with a few minutes and goes up to fifteen minutes, gradually increasing the amount of body surface exposed to the water in the bath. If the heart is weak, with high blood-pressure, and nervous heart trouble, the water is allowed only as high as the nipples. In the necessary after-treatment

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the patient should gradually increase his amount of exercise with a view to preparing himself for resumption of work—(*British Journal of Actinotherapy*, July, 1929, p 79)

The Treatment of Gonococcal Arthritis

C Lian, P Poincloux and M Copelovici Cope report successful results in the treatment of gonococcal arthritis by vaccine therapy. In a series of 18 cases the condition cleared up in every case. The best results were obtained by the local injection of the vaccines into the affected joints, and this procedure is recommended by the authors for the treatment of this troublesome condition, with a view to bringing about the best functional result—(*Gazette des Hôpitaux*, July 27, 1929, p 1,086)

Vomiting after Cataract Extraction

F W Law, after a study of 141 cases of cataract extraction, concludes that vomiting after this operation is a far less serious occurrence than is generally supposed, and that it is very rare for any harm to happen to the operated eye as a result. This is of great interest considering the effort necessarily involved, especially as vomiting usually occurs before the edges of the incision have had time to become at all firmly united. It would seem that there is little to gain from excessively rigid treatment of patients after extraction in the direction of forbidding movement of any kind, for every patient who has a prolapse as an apparent result of vomiting there are five who suffer the same misfortune for no apparent reason, all being otherwise under the same conditions—(*British Journal of Ophthalmology*, July, 1929, p 358)

The Treatment of Cancer of the Oesophagus

J H Sant has come to the conclusion that, because of the anatomical structure and relations of the oesophagus, the highly malignant carcinomas of the organ, the frequent occurrence of metastasis, the danger of fatal infection and the mutilation which must always cause great shock, surgical removal of cancers of the oesophagus cannot be expected to be attended with any degree of success. Although a successful case may occasionally be reported this will never justify routine surgical exploration and the attempted removal of oesophageal carcinoma with its appalling mortality. The only operation which has attained even a small degree of success is extirpation of a cervical oesophageal carcinoma with subsequent double flap skin oesophagoplasty after the manner first introduced by von Hacker, or the single-flap method of Lane and Ach. Thus it appears that only palliative measures can be applied as a routine in the treatment of patients with this disease. These include the use of radium, deep X-rays, diathermy, intubation, gastrostomy and dilatation—(*Archives of Surgery*, July, 1929, p 108)

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Reviews of Books.

Recent Advances in Tropical Medicine By Sir LEONARD ROGERS, C.I.E., M.D., F.R.C.P., F.R.S. Second Edition, 1929 Large Crown 8vo, pp. x and 439, illustrations 16 London J and A Churchill 12s 6d

IT is not surprising that little more than a year has elapsed since the first appearance of this book, and that a second edition has now been required. Among other additions in this edition there is an article on Oroya fever and verruga peruana which are different manifestations of infection by the same organism, the *Bacillus bacilliformis* of Noguchi, the difference depending on variations in its virulence. The bacillus is conveyed by a tick *Dermacentor andersoni*, and being found in the red cells in Oroya fever causes very rapid and severe anaemia. Accounts, full of condensed information, have also been added of granuloma inguinale and climatic bubo, the recent work of H. M. Hanschell, published this year, being incorporated. The pathology and modern treatment of sprue are most successfully described, and in the article on leprosy Sir Leonard Rogers writes enthusiastically of the results of treatment by injection of chaulmoogra oils and their derivatives, of leprosy he estimates there are three million cases in the world. But he is careful to disclaim any suggestion that the improved chaulmoogra oil methods provide an absolute specific for the disease, comparable with quinine in malaria, emetine in amœbiasis, or salvarsan in syphilis.

On Prescribing Physical Treatment By MATTHEW B. RAY, D.S.O., M.D. Demy 8vo, pp. ix and 179, plates 4, figs 8 London William Heinemann (Medical Books), Ltd., 1929 10s 6d

ONE of the changes induced by the experiences of the War has been the greater utilization of physiotherapy of various kinds, and Dr Matthew Ray, formerly of Harrogate, who is well qualified for the task, has written a guide intended to give the practical information necessary to prescribe the various forms of physical treatment. The forms of treatment dealt with are of four main kinds, surface thermal applications, which are divided into conductive, or applied by continuity to the skin by heated air or water, and radiant, or heat thrown on the surface of the body from some outside source, massage and manipulations by the hand or by a mechanical contrivance, electrical currents of various kinds including diathermy, and ultra-violet radiation. The ground, though extensive, is clearly and succinctly covered. The physiological changes induced in the body by the forms of treatment described are summarized, and it is thus made clear that this knowledge is of great importance in a proper understanding of what are the indications for treatment and what can be expected from them. An advantage of this book is that it contains information which must usually demand a search in several separate treatises.

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The Clinical Value of Various Urinary Antiseptics.

B A Thomas and I K Wang publish a study of the clinical value of various so-called urinary antiseptics, under identical laboratory and clinical conditions, with the following results — (1) Mercurochrome given in dosage of 300 mgm three times daily by the mouth in salol coated pills will yield about 30 per cent of antisepstized urine, the objections lie in its irritation of the digestive tract, (2) Hexylresoreinol administered in 25 per cent. olive oil in dosage of 0.6 gram three times a day has the same objections as mercurochrome, and the antisepstic value in the excreted urine is much less, (3) Fifteen grains of hexamethylenamin three times daily frequently causes indigestion, and the excretion of bactericidal urine is a matter of great uncertainty, (4) The germicidal value of methylene blue proved much higher than was expected, but the dye did not as a rule produce sufficient concentration in the urine to be of antiseptic value, (5) Pyridium administered in dosage of 0.2 gram three times daily by mouth proved to be a very weak antiseptic, and its action against *B. coli* was practically nil, (6) Salol as a urinary antiseptic has no place in urology, since the phenol content excreted in the urine never reaches a germicidal strength It seems, however, to render the urine bland and less irritating to the inflamed urinary tract, and thereby confers a certain amount of comfort on patients It is prone, however, in some patients, to cause gastric intolerance — (*Journal of Urology* [Baltimore], July, 1929, p 22)

The Causation of Rheumatic Fever

J Tertius Clarke suggests that the geographical distribution of *Ceratophyllus fasciatus*, the commonest flea of northern temperate climates, and of rheumatic fever is so similar as to make it seem possible that the insect is in some way connected with the etiology of the disease The similarities are not only those of geographical and local distribution, but of temperature and humidity, temperature being the more important — (*British Journal of Children's Diseases*, April-June, 1929, p 99)

The Tannic Acid Treatment of Burns

A J Hutton observes that the advantages of the tannic acid treatment of burns are many An insensitive coagulum is produced, and until it separates there is practically no pain or discomfort Acute toxæmia is reduced to a minimum In superficial burns, the coagulum strips off, leaving perfect healing In deeper burns however, there is a certain degree of sepsis The treatment is capable of a wide application as a first-aid measure, as such it is conveniently applied by soaking lint or gauze in the tannic acid solution (2.5 per cent aqueous solution, freshly prepared), and applying it over and around the burned area — (*Glasgow Medical Journal*, July, 1929, p 1)

Reviews of Books.

Recent Advances in Tropical Medicine By Sir LEONARD ROGERS, C.I.E., M.D., F.R.C.P., F.R.S. Second Edition, 1929 Large Crown 8vo, pp x and 439, illustrations 16. London J and A Churchill 12s 6d

It is not surprising that little more than a year has elapsed since the first appearance of this book, and that a second edition has now been required. Among other additions in this edition there is an article on Oroya fever and verruga peruana which are different manifestations of infection by the same organism, the *Bacillus bacilliformis* of Noguchi, the difference depending on variations in its virulence. The bacillus is conveyed by a tick *Dermacentor andersoni*, and being found in the red cells in Oroya fever causes very rapid and severe anaemia. Accounts, full of condensed information, have also been added of granuloma inguinale and climatic bubo, the recent work of H. M. Hanschell, published this year, being incorporated. The pathology and modern treatment of sprue are most successfully described, and in the article on leprosy Sir Leonard Rogers writes enthusiastically of the results of treatment by injection of chaulmoogra oils and their derivatives, of leprosy he estimates there are three million cases in the world. But he is careful to disclaim any suggestion that the improved chaulmoogra oil methods provide an absolute specific for the disease, comparable with quinine in malaria, emetine in amoebiasis, or salvarsan in syphilis.

On Prescribing Physical Treatment By MATTHEW B. RAY, D.S.O., M.D. Demy 8vo, pp ix and 179, plates 4, figs 8. London William Heinemann (Medical Books), Ltd., 1929 10s 6d

ONE of the changes induced by the experiences of the War has been the greater utilization of physiotherapy of various kinds, and Dr Matthew Ray, formerly of Harrogate, who is well qualified for the task, has written a guide intended to give the practical information necessary to prescribe the various forms of physical treatment. The forms of treatment dealt with are of four main kinds, surface thermal applications, which are divided into conductive, or applied by continuity to the skin by heated air or water, and radiant, or heat thrown on the surface of the body from some outside source, massage and manipulations by the hand or by a mechanical contrivance, electrical currents of various kinds including diathermy, and ultra-violet radiation. The ground, though extensive, is clearly and succinctly covered. The physiological changes induced in the body by the forms of treatment described are summarized, and it is thus made clear that this knowledge is of great importance in a proper understanding of what are the indications for treatment and what can be expected from them. An advantage of this book is that it contains information which must usually demand a search in several separate treatises.

THE PRACTITIONER

Percussion of the Chest By J B McDougall, M.D., F.R.C.P. Ed
Cr 8vo, pp viii and 143; 10 illustrations London: H. K.
Lewis & Co., Ltd. 6s.

From the nature of the subject, books on physical diagnosis do not often offer much in the way of attraction to the qualified reader who rightly or wrongly imagines that he has little to learn in this respect. Dr McDougall, the Medical Director of the British Legion Village, Preston Hall, where there are a number of tuberculous ex-soldiers, is therefore to be congratulated on having treated the isolated method of percussion in an eminently interesting manner. This well-written handbook is divided into four sections which deal with the history, the technique, the acoustic aspect, and the variations in the percussion note in some thoracic diseases. The memory of Leopold Auenbrugger's classical *Inventum Novum*, and of Corvisart, who in 1809 translated it into French and first directed attention to the phenomenon of resistance in percussion of the chest, is kept green, and portraits of these two medical leaders are appropriately inserted. The superiority of light percussion, as indeed was mentioned by Auenbrugger, is insisted upon, and Pierry is shown to have departed from this teaching and to have been responsible for the introduction of heavy percussion. The history of percussion is given down to the conclusions reached by the late Clive Rivière as a result of studying Abrams' lung reflex of contraction. The use of auscultatory percussion is pointed out and the method of employing orthopercussion explained with the help of an illustration. That Dr. McDougall speaks with authority on percussion is proved not only by the matter set out, but by the almost accidental admission that for twelve years he has been working at the subject and applying the work of Tobias Matthay on pianoforte tone production to percussion. It is to be hoped that when a deservedly second edition is brought out auscultation will be similarly treated, as in the late Dr Samuel Gee's classic. Perhaps the author will then also provide an index, which, it may be hinted, is of use to readers other than mere reviewers.

Physical Diagnosis By CHARLES PHILLIPS EMERSON, M.D. Second edition, revised Med 8vo, pp xv and 553, 334 illustrations London: J B Lippincott Co., 1929, 35s.

In 1906, Dr C P Emerson, Professor of Medicine in the Indiana University School of Medicine, brought out a useful work on Clinical Diagnosis, and a year ago followed this up by one on Physical Diagnosis which is now in a second and revised edition. Physical diagnosis is defined as that branch of medical diagnosis in which the patient's body is examined in order to discover the physical signs by the senses aided only by simple instruments, such as the stethoscope, more elaborate apparatus, such as that of X-rays and the electrocardiograph, and the applications of chemistry and bacteriology constitute separate branches of medical diagnosis. Though its methods are simple, skill in physical diagnosis is difficult to attain, and in this age so biased in regard to elaborate methods and equipment, laboratory methods, invaluable as they have proved to

REVIEWS OF BOOKS

be, tend to discredit physical diagnosis Ordinary textbooks on physical diagnosis often tend to consider the thoracic viscera and little more, this omission is admirably corrected in Dr Emerson's treatise, which surveys the whole of the body in a number of concise sections which are generously illustrated, the number of the figures being considerably more than half of the number of pages

The Causes and Prevention of Maternal Mortality By HENRY JELLETT, M.D., F.R.C.P.I. Pp 300 London J and A. Churchill 15s net

THE appearance of Dr Jellett's book is most opportune, for the problem of maternal mortality is very much in the public eye at the moment and indeed has become an important political question This being so, it behoves all members of the medical profession, and particularly those engaged in general practice, to make themselves fully acquainted with all aspects of the subject so that they may be prepared for the various measures for its solution which are bound to make their appearance in the very near future The author deals fully with his subject and in the book the reader will find a mine of information Possibly there is a tendency for principles to be confused by too much detail, particularly as regards the management of the parturient woman, but one has to recognize that the subject is a very wide one, and practically covers the whole field of obstetric practice Plans for an improved maternity service are in the air and the sooner we begin to think about their details the better Dr Jellett's views are quite definite, and he would raise the status of the midwife and make her responsible for the care of all normal cases In support, he brings forward convincing statistics from Holland and Scandinavia, where such a system is in force and the maternal mortality rate is much lower than in other countries The medical practitioner would still remain an important unit in the service, but his rôle would be the diagnosis and treatment of abnormalities In the final chapters will be found an admirable discussion of the causes of maternal mortality, together with sound suggestions for its reduction, based on the author's unrivalled experience The book is an excellent one and should find a place on the shelves of every general practitioner and others interested in this all-important subject

Surgical Radiology By A P BEETWISTLE, M.B., Ch.B., F.R.C.S. Ed. With an introduction by D. P. D. Wilkie, O.B.E., M.Ch., F.R.C.S. Pp 142 and xi, 20 illustrations London J and A Churchill 8s 6d

ALTHOUGH the title of this work might perhaps arouse expectations that are hardly realised, this is undoubtedly a useful little book for the general practitioner, written from the author's practical experience and revised as regards certain special departments by acknowledged authorities It expounds many points of interest and most of the illustrations are excellent

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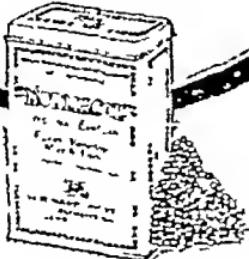
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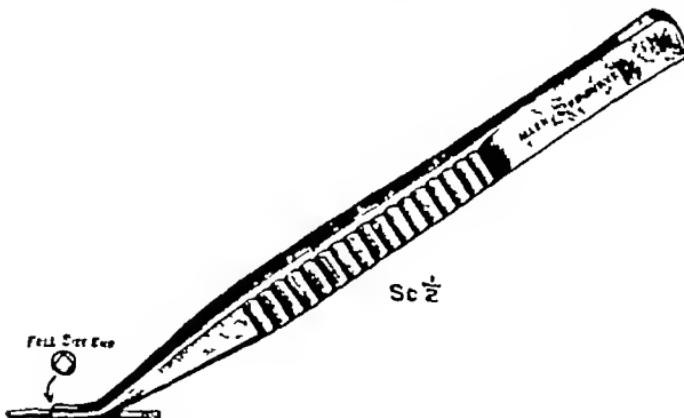
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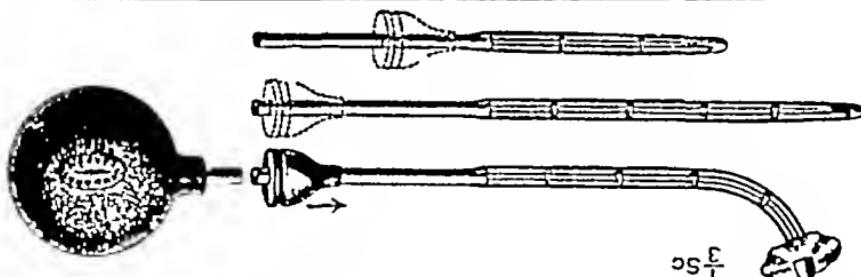
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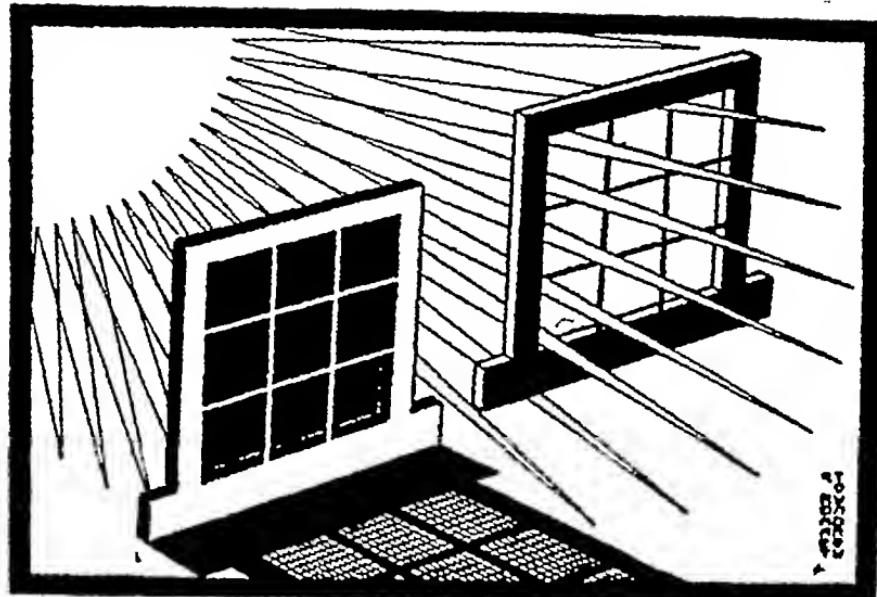
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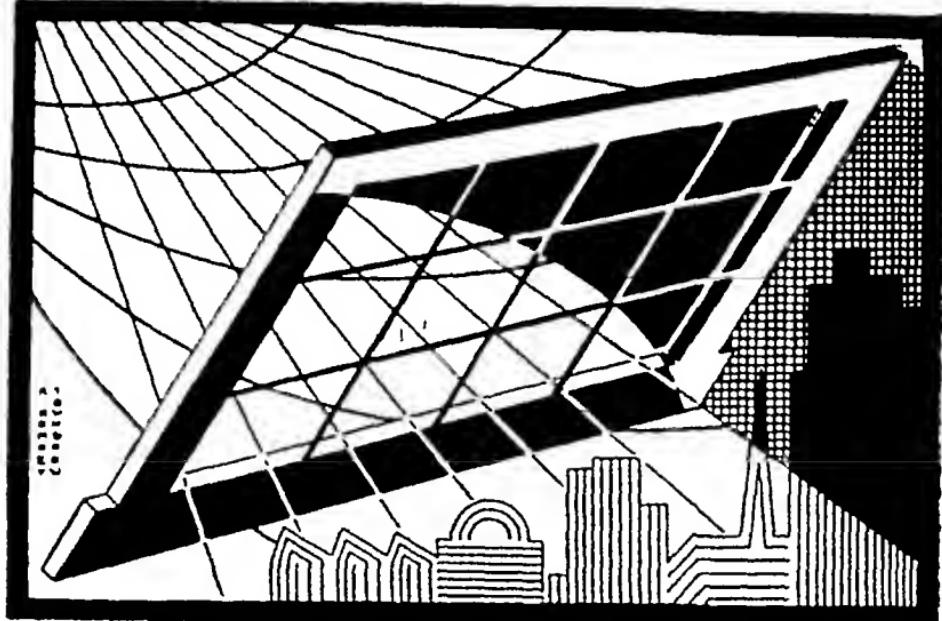
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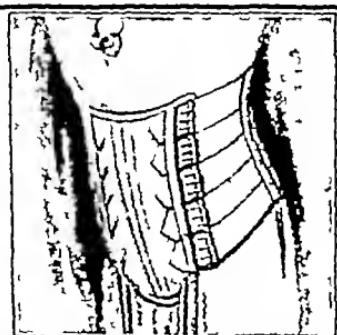
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Vol CXXII.

(January-June 1929)

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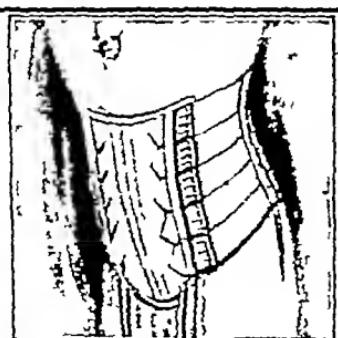
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Candidates must be British subjects under 32 years of age at the time of application and must be registered under the Medical Acts in force in Great Britain and Northern Ireland.

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PAI

The monthly rates of pay for European officers in the Service who have a non-Asiatic domicile are as follows —

Rank	Service in Rank	Basic Pay	Overtime pay	Year of Total Service
LIEUTENANT		Rs 500	Rs 150	1st
CAPTAIN	1 During first 3 years' service as Captain	650	150	2nd
	2 With more than 3 and less than 6 years' service as Captain	750	25	3rd
	3 With more than 6 years' service as Captain	850	25	4th
MAJOR	1 During first 3 years' service as Major	950	25	5th
	2 With more than 3 and less than 6 years' service as Major	1,100	25	6th
LIEUTENANT-COLONEL	1 Until completion of 23 years' total service	1,250	30	7th
	2 During 24th and 25th years' service	1,500		8th and over
	3 After completion of 25 years' total service	1,600		
	4 When selected for increased pay	1,700		
		1,850		

EXTRAS.—In addition to the above rates, various allowances are admissible for a large number of special appointments on both the military and the

civil side which may be held by members of the Indian Medical Service. Special high rates of pay are also attached to the numerous administrative appointments open to officers in both branches of the Service.

WAR SERVICE CONCESSIONS

Any service rendered by an officer during the war as a medical or combatant officer or in a position usually filled by an officer may be counted as service for increments of pay, promotion, retirement and retired pay, but not for gratuity.

One half of any service in the ranks during the war may be counted as service for retirement and retired pay only.

OUTFIT ALLOWANCE

Officers on appointment will receive an outfit allowance of £50.

PRIVATE PRACTICE

With the exception of Administrative Officers, military or civil, and officers holding certain special appointments, officers are not debarred from taking private practice so long as it does not interfere with their proper duties.

PENSIONS

Service	Rates per annum	Service	Rates per annum
After 17 years	£400	After 23 years	£620
18	£430	19	£660
19	£460	20	£700
20	£500	21	£750
21	£540	22	£800

These rates are subject to alteration on account of a rise or fall in the cost of living as compared with the year 1919 to an extent not exceeding 20 per cent in all, the revision being undertaken triennially. With effect from 1st July 1927 a reduction of 4½ per cent has been made on this account from the amounts shown.

There are additional pensions ranging from £65 to £350 per annum for officers who have held administrative appointments.

PASSAGES

An officer on appointment is provided with a free passage to India. The wives and families of officers who are married prior to the date of the officers' embarkation on first appointment will also be provided with free passage to India, subject to the payment of messing charges.

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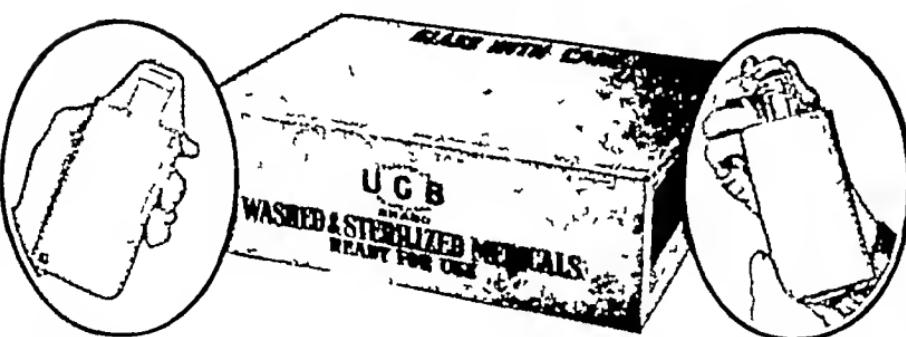
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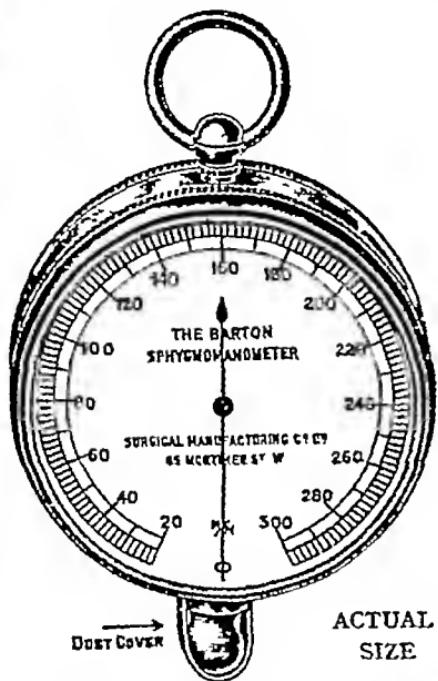
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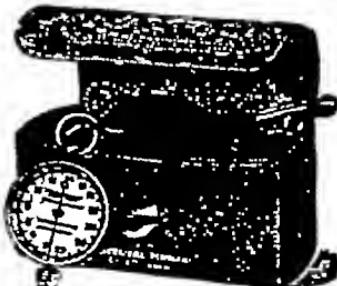
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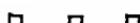
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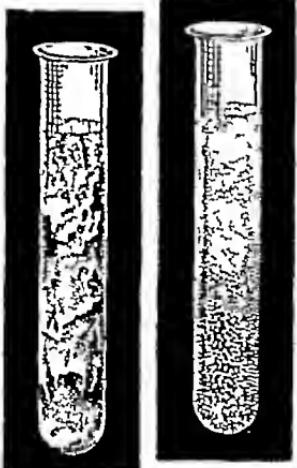
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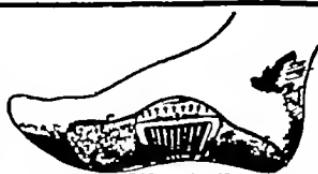
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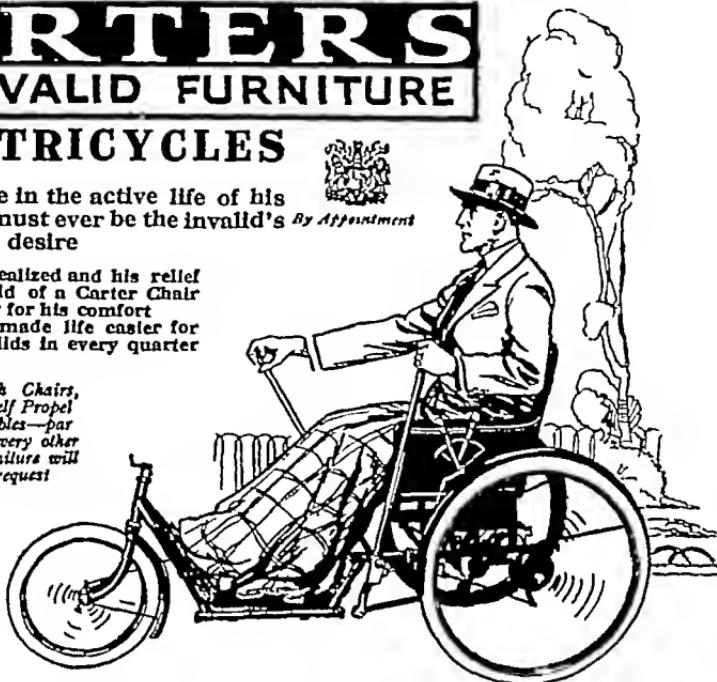
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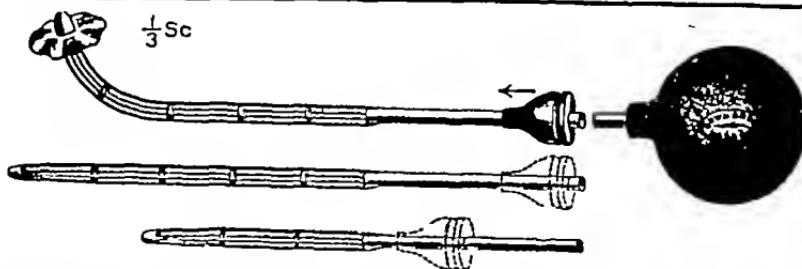
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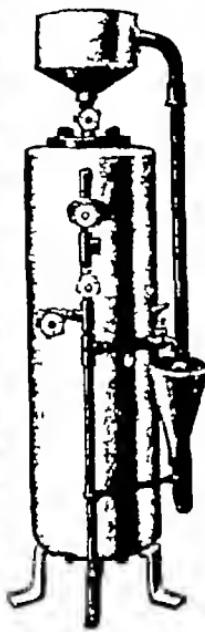
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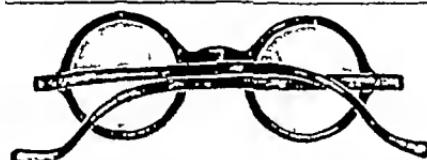
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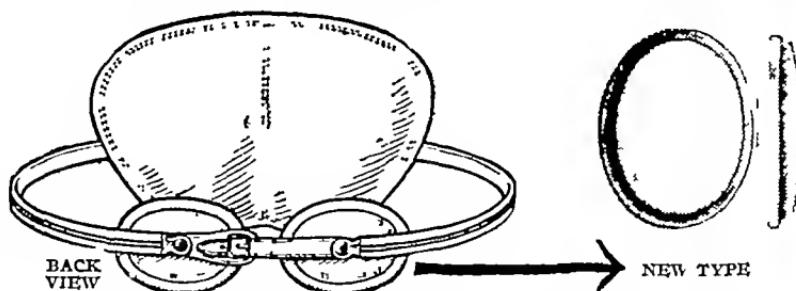
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THE LANCET

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"There is more character in the flavour of rye than of wheat, and the food value of the former [rye] needs no comment."

"On analysis [of Ryvita] the following results were obtained —

Carbohydrates, altered starch, hemicellulose, &c.	74.8 %
Protein	11.6 %
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Ash	1.8 %
Fat	1.3 %
Fibre	1.5 %
Calorie value per lb.	1662

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PROF. R. H. A. PLIMMER, D.Sc., shows in his "*Analysis and Energy Value of Foods*" that in 12 tests of white bread, and 5 tests of brown (wholemeal) bread, he found as the average value in calories —

1 lb white bread had 1036.9 Calories	1 lb brown bread had 1012.4 Calories
But the " <i>Lancet</i> analysis above shows —	
1 lb. "RYVITA CRISPBREAD" . . .	1662 Calories

"RYVITA" & VITAMINS

Prof. R. H. A. Plimmer, D.Sc., in the Government Official publication "*Analysis and Energy Value of Foods*" shows that in "Energy Value" and other important points rye surpasses wheat.

Again in "*Vitamins—What we should eat and Why*" this great authority has the following —

"The most serious loss of B vitamins from our foods is in the preparation of cereals in order to make them white, for most grains have an abundance of B vitamin which is removed in the milling. In some countries rye bread is largely used. *Owing to a difference in the structure of rye grain the germ cannot be removed in the milling.* Consequently rye bread is balanced by its own B vitamin, and is much better than white wheat bread. . . . On comparing the three grain (wheat, oatmeal and rye) in respect to vitamin content, rye comes first, whole wheatmeal next, and then oatmeal."

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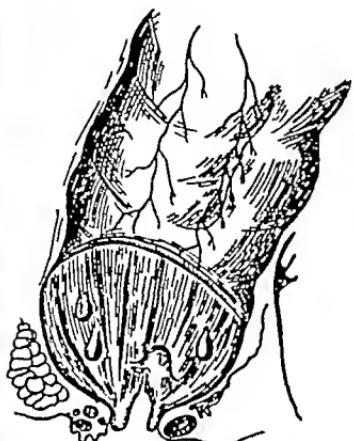
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AGAROL Brand Compound lubricates, therefore prevents irritation by friction, it segments and softens the faecal mass, and thereby prevents possible excessive strain in the expulsion of it, it stimulates the peristaltic force without the shock of cathartics

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Perfect emulsification stability pleasant taste without artificial flavouring free from sugar alkalies and alcohol no oil leakage no griping or pain no nausea no habit forming.

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My last sample was used on a patient suffering from acute Ptomaine poisoning following a meal of shell fish (mussel) at 10.30 p.m. Symptoms first appeared at 12.30 a.m., and when I saw him at 3.0 a.m. he was vomiting blood and passing almost pure blood per rectum. He had commenced cramps and nervous twitchings which would shortly have gone on to tonic convulsions. He was very collapsed and had a weak pulse. I gave him ONLY Kaylene in cold water, one drachm every quarter of an hour from 3.0 until 8.0 a.m., when I felt it safe to leave him. For the next two days Kaylene was given every one to two hours and was then followed by Kaylene-ol. No other medication of any sort was used, and he made an excellent recovery. This follows a somewhat similar case which I treated at the end of last year.

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Yours faithfully,
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The patient's favourite cathartic must be eliminated before a regular habit time of bowel motion can be instituted.

'Petrolagar' Brand Emulsion of paraffin suits such patients admirably.

Prescribe 'Petrolagar' Brand Emulsion for five or six of your obstinate cases and you will convince them that cathartic medication is wrong and that this emulsion is much cheaper in the end.

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in underweight conditions and provides a perfectly balanced, highly nutritive diet for growing children.

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For many years it has been successfully used and prescribed by the medical and nursing professions for fast-growing children, for invalids, for expectant and nursing mothers—in all cases where it is particularly important to sustain strength and replenish natural energy

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Affords relief in all cases of high blood pressure.

The daily exhibition of Sal Hepatica, the non-habit forming saline purgative, has proved of extreme benefit in all cases of high blood pressure. Q Sal Hepatica is also recommended as a rapid means of relieving the stress in cases of dysmenorrhœa. One or two drachms administered on the morning before the expected period, and again at its outset, rarely fails to relieve both the pain and depression. Q In chronic constipation the regular exhibition of Sal Hepatica for a week or two restores the daily habit of defecation. Q Sal Hepatica is not a "patent medicine" and is only advertised to the medical profession.

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*the proved medicinal saline laxative
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Q Sal Hepatica contains sodium sulphate, sodium phosphate, sodium chloride and lithia citrate in an effervescent medium.

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"Sweeps the bowel clean"

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For all conditions of Intestinal Stasis

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No constituent of MALTO-YERBINE is affected by the Dangerous Drugs Regulations, but prescribers can, of course, order the addition to the preparation of codeine, morphine, etc., as special occasion may require.

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Members of the Medical Profession are invited to write for a trial bottle of Malto-Yerbine free of all charge to

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Nujol

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For Oral and Hypodermic Administration

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Prepared at the Wellcome
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Of uniform composition and
therapeutic activity Contains
the true alkaloid, particular care
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Gr 1/4 (0.016 gm.)

Bottles of 25, 100 and 500
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Bottles of 25, 100 and 500
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Tubes of 6, 8d per tube

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Boxes of 10 1 c.c. phials 3/- each

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EPHEDRINE SPRAY COMPOUND

Consists of Ephedrine, 1 per cent, Menthol
Camphor and Oil of Thyme, of each 2 per
cent., in a base of 'Paroleine'—a high
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Bottles of 1 fl. oz 2/3 each



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THE PRACTITIONER

JULY

1929

Introduction.

BY SIR HUMPHRY ROLLESTON, BART., K.C.B., M.D., F.R.C.P.
*Physician in Ordinary to H.M. the King, Regius Professor of Physic,
University of Cambridge*

THE articles in this issue of THE PRACTITIONER deal with asthma from various aspects and express views which differ considerably. This is appropriate because thought-stimulating, for while, as Dr Arthur Hurst points out in the opening article, there is in all forms of this reaction a fundamental nervous instability, the exciting factors, as several of the articles show, are numerous though often difficult to determine in a given instance. It might, therefore, as in the case of the epilepsies, be better to speak of the asthmas instead of one disease. Further, it must be borne in mind that the asthmatic reaction is but one, and a local, manifestation of the underlying condition which gives rise to the phenomena described by Dr John Freeman in 1920 as the toxic idiopathies, the others being skin eruptions, such as dermographia, eczema and urticaria, migraine, and the remarkable condition of intermittent hydrarthrosis or paroxysmal arthritis, which may not be such a curiosity as is generally taught. In his article on "Tissue Damage as a

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by Wolff-Eisner independently, and by the late S. J. Meltzer, of New York, in 1910, that asthma is anaphylactic in nature. Dr. James Adam, of Glasgow, with thirty years' experience, argues that asthma is a toxic condition, but warns us not to lose sight of the importance of the "soil" while attracted by the "seed" and allergens. Dr. André also emphasizes the importance of toxæmia, and describes the treatment at Mont Dore and that by ephedrine. In his authoritative article, Sir William Willcox lays stress on occult sepsis in the naso-pharynx, tonsils, teeth, alimentary canal and genito-urinary tract as much the commonest exciting cause of asthma.

With regard to treatment, Dr. Hurst points out that of the numerous forms which have been advocated, two appear to be directed to the diathesis, and that these alone, if successful, may be regarded as deserving the epithet "cures", Dr. James Adam's dietetic treatment has not in his experience been followed by a complete cure. The other is residence at an altitude of over 4,000 ft., but usually this does not do more than provide an alleviation for the time being. With this Professor W. Storm van Leeuwen is in agreement, but he fully describes his method of imitating the conditions at a high altitude by providing asthmatics with allergen-proof sleeping-rooms whereby the products of bacteria, moulds, insects, including mites, are excluded from the air of the room. Professor W. E. Dixon suggests that by keeping the bronchioles dilated for two or three months by ephedrine, the conditioned reflex may be broken and a cure secured. The psychological factor, somewhat neglected in the past, receives attention, especially from Dr. Hurst, and, like the other problems in connection with this subject, proves the need for further skilled and patient investigation in order if possible to arrive at some means of accurate diagnosis which will assure successful treatment in every case.

The Pathogenesis and Treatment of Asthma.

By ARTHUR F HURST, M.D., F.R.C.P.

Senior Physician to Guy's Hospital, Chairman of the Medical Advisory Committee of the Asthma Research Council

THE chemical constitution of the body fluids is not exactly the same in all healthy individuals, but shows slight variations from the average normal. I believe that these slight variations, though compatible with perfect health, form the basis of the congenital and often inherited constitutional tendency to develop certain diseases.

The balance between the vagal and the sympathetic constituents of that part of the respiratory centre in the medulla, which together with the associated peripheral ganglia controls the bronchi, is perfectly adjusted in normal individuals. I believe that the asthma diathesis—the congenital and often inherited constitutional abnormality which is the one essential factor in the pathogenesis of asthma—is caused by a slight deviation from the average blood chemistry, which results in the vagal constituent of the bronchial nervous system being the predominant partner. In such individuals certain chemical, reflex and psychical stimuli, which have no effect on normal individuals, give rise to spasm of the bronchial muscles and hypersecretion of the bronchial mucous glands, together with congestion of the bronchi, which is the natural accompaniment of their excessive functional activity.

Some indication of the nature of the primary

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biochemical factors which predispose to asthma has recently been discovered by Oriel, whose investigations at Guy's Hospital have demonstrated that even in the intervals between attacks the blood of asthmatics shows certain constant divergencies from the average normal

A further biochemical factor depends upon the varying activities of the internally secreting organs. The effect of fatigue, as shown by the increased tendency to asthma towards the end of each day, each week, and each period of work without holiday, is best explained as the result of exhaustion of the supra-renal glands, whose deficient secretion helps the vagal constituent of the bronchial nervous system to gain the upper hand over the sympathetic constituent, the activity of which requires an adequate supply of adrenalin. In support of this theory the blood pressure of asthmatics is generally low, and Oriel has found that many of them have well-marked hypoglycæmia and give a glucose tolerance curve indistinguishable from that found in Addison's disease. The unfavourable effect of menstruation on many female asthmatics must also depend upon some alteration in the normal balance of the internal secretions.

In recent years so much attention has been directed to the question of hypersensitiveness to proteins and other chemical substances in asthma that there has been a tendency to regard this as the one essential factor. The truth is, however, that an individual who is hypersensitive to one or more proteins only suffers from asthma if he has the constitutional tendency, the nature of which I have just described, and there is no doubt that many asthmatics are not hypersensitive at all, their attacks being caused by reflex and occasionally psychical stimuli. It is none the less of the greatest importance to give every asthmatic an exhaustive cross-examination with the object of discovering

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whether some or all of his attacks are due to his being hypersensitive to the proteins of one or more articles of food, an animal emanation, a pollen, house-dust, orris root face powder, or the toxins of some organism, which is present in the body owing to infection of the bronchi themselves, the tonsils, nasal sinuses, teeth, or even the appendix or gall-bladder. In some cases further information can be gained by cutaneous tests, especially with food proteins in children, and with pollens at all ages, as Blackley showed over fifty years ago, but the method has proved of far less practical value than was at one time expected.

The nose is the most important reflex source of asthma. Brodie and Dixon showed that in animals stimulation of an area on the septum produces bronchial spasm. In individuals with the asthma constitution irritation of the corresponding area gives rise to a similar reflex. When a man with a narrow airway lies down at night the passive congestion of the cavernous tissue of his turbinates may be sufficient to bring them into contact with the asthmogenic area on the nasal septum. The narrow airway may be congenital or result from a deflected septum or from chronic infection which leads to permanent congestion of the mucous membrane and the development of polypi. A distended stomach and a distended rectum both may produce reflex attacks of asthma quite independently of any form of alimentary toxæmia, an evacuation of the stomach or rectum producing immediate relief long before a change could take place in the blood from diminished absorption of poisons.

The most common psychological factor in asthma is expectation. An individual, who has been accustomed to having attacks of asthma in certain places or under certain conditions, is exceedingly likely to continue to do so when the original chemical or reflex cause has ceased to be operative. This is a result of

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auto-suggestion, but it must be remembered that no amount of suggestion can produce anything more than tachypnoea, without any trace of over-activity of the bronchi, in anybody who has not the asthma diathesis.

TREATMENT

In discussing the treatment of asthma we have to consider the underlying constitutional abnormality, the chemical, reflex and psychological factors which can initiate an attack, and the attack itself. It is clear that the only true cure of asthma would be to abolish the diathesis by bringing the biochemical constitution of the body fluids to the normal level. Removal of exciting factors leads to diminution in the frequency of attacks, and complete success in this direction may lead to an apparent cure. But the condition is not really cured, as the diathesis remains, and at any time the individual may become sensitized to another protein, as, for example, after an attack of influenza or other infection involving the nose, throat or bronchi, or a new peripheral source of irritation may arise which leads reflexly to attacks, or some psychological disturbance may develop which results in a relapse.

Moreover, the effects of desensitization are only temporary, and avoidance of exciting causes, such as cats or pollens, even for long periods, does not diminish the tendency to asthma on re-exposure. I used to say that the only cure of asthma was not to have it, by which I meant that one might hope that the bronchial nervous system might cease to be abnormally irritable as a result of disuse if it were never called into activity. But this is unfortunately not always true, as I have now seen numerous patients who, after thinking themselves cured, have relapsed for periods varying between one and twenty-five years. Lastly, treatment

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of the paroxysm is of the greatest importance, as, if successful, it may make it possible for a man to continue in full activity instead of becoming a hopeless invalid, but such treatment is, of course, merely palliative.

Among the innumerable forms of treatment which have been advocated, two appear to attack the diathesis; these alone, if successful, might be regarded as genuine "cures." The first is by means of diet, a treatment which has been very successful in Adam's hands, especially in children, but beyond the fact that his diet is a simple one it is not easy to account for its success, and I have not myself seen anything approaching a complete and permanent cure result from its adoption. The second is by residence at a height of over 4,000 ft. Asthma is almost unknown among the natives of the Engadine, Davos, Villars, and similar centres in Switzerland, and at least 90 per cent. of asthmatics lose all or nearly all their symptoms within a very short period of their arrival in these places. Unfortunately, the effect is only temporary if the stay be a short one, the asthma returning often within a few hours of reaching the plains.

But residence for one or preferably several years in the Alps almost invariably leads to a permanent cure in children in spite of complete failure of every known form of treatment at home. Storm van Leeuwen attributed the effect of the Alps to freedom from dust. I am convinced that this is erroneous, as there is no obvious difference between the hotels at a height of 4,000 ft. and those 2,000 ft. lower, and yet a man who is severely asthmatic in the latter is quite well and can take vigorous exercise within twenty-four hours of moving to the former. Moreover, no house could be fuller of "allergens" of every kind than the hermetically-sealed chalets of the Alpine peasants during the winter,

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although asthma is unknown among them. It is also a common experience among asthmatics that exposure to known exciting causes is without result when in the mountains, it seems, in fact, that nothing could produce an attack after the 4,000 ft level has been passed. The effect is clearly due to altitude, a conclusion which was confirmed by the experience of asthmatic members of the Air Force, who found they could always gain relief by flying sufficiently high. It is unknown why altitude should have this remarkable effect, but I surmise that it will be found that the lowered oxygen tension leads to biochemical changes in the blood, which result in diminution in the irritability of the bronchial nervous system.

It is, I think, possible to look forward to the time when sufficient is known about the biochemical changes which constitute the asthmatic diathesis to make it possible to imitate the effect of high altitudes upon this by well-defined changes in the diet, aided perhaps by drugs which can correct deviations from the normal reaction of the body fluids and make good any deficiencies in their mineral or other constituents.

The methods of dealing with the innumerable chemical stimulants of the irritable bronchial nervous system, whether they are associated with hypersensitivity or not, will be fully discussed by other writers in this special number of *THE PRACTITIONER*.

With regard to reflex exciting causes, it is necessary to emphasize the importance of avoiding distension of the stomach and the rectum. In the case of the nose there are three distinct factors to be dealt with. The first and most common is chronic infection of the sinuses, especially the ethmoids, with secondary development of polypi; this must be dealt with by the cure of the infection, which can generally be effected by packing with silver preparations and vaccination without more radical operations than the removal of

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the polypi. The second factor is obstruction of the nasal passage, it is essential to overcome this, as few asthmatics can permanently be relieved if they are mouth-breathers. Lastly, the asthmogenic area on the nasal septum should either be destroyed by cauterization, or rendered inoperative by so correcting the other factors present that the turbinates no longer come into contact with it, even when distension of their cavernous tissue occurs as a result of gravity on going to bed.

The psychological factor requires consideration in the treatment of every case of asthma. At least 75 per cent of patients become either completely or almost free from symptoms directly they enter a hospital or clinic. This is doubtless often in part due to the fact that they have got away from the allergens present in their homes which were responsible for some of their attacks, it is often partly and sometimes entirely due to the expectation that they are going to derive benefit from the treatment they are about to receive. It is essential to bear this in mind in estimating the effect of any treatment. If, for example, they are at once put into a dust-free chamber or are given some new drug, it is natural that they will ascribe the inevitable improvement to the specific treatment, whereas in all probability an equal degree of improvement would have occurred without any active treatment at all.

It is always wise to instil a spirit of optimism into asthmatics and to make them realize that improvement may at any time occur and that conditions which formerly gave rise to asthma may cease to do so. In this way alone can the influence of expectation in the production of attacks be overcome. In some cases more definite psychotherapy is indicated, and even gross suggestion sometimes proves beneficial. I have, for example, had a patient with severe *status asthmaticus*, who had found that he only obtained relief

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after the injection of $\frac{1}{4}$ grain of morphia. Before I saw him, my house physician found that he obtained equal relief when water was substituted for the morphia, the relief being not merely subjective, but accompanied by an immediate and complete disappearance of the physical signs indicating severe spasm of the bronchi.

In the treatment of the asthmatic paroxysm the preponderating activity of the vagal nerve supply to the bronchi can be overcome by means of drugs, such as atropine, which paralyse the vagus, or by adrenalin which stimulates the broncho-dilator fibres of the sympathetic. The inhalation of fumes from powders containing stramonium or belladonna, which was formerly the universal method of treatment, had the grave disadvantage of causing chronic bronchitis by irritating the bronchial mucous membrane. This treatment should never be used, as the opposite method of restoring the balance by means of adrenaline has no such disadvantage and is also more promptly and more constantly effective. The patient should be taught to inject the adrenaline himself, as if he does this at the first sign that an attack is developing it will be aborted, and a single *minim* will often be sufficient, though five or more would have been required had he had to wait for a doctor or nurse to give the injection at the height of the attack. This small dose gives rise to none of the unpleasant symptoms often caused by larger doses, and as it does not even raise the blood pressure there is no danger of damaging the arteries. Its use has in many cases the further justification of making good a deficiency in the secretion of adrenaline, just as thyroid preparations do in myxoedema.

The treatment also reproduces the way in which relief may on rare occasions occur under natural conditions. If an individual during a severe attack of

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asthma comes under the influence of sudden fear or anger, the two emotions which Cannon showed stimulate the secretion of adrenaline, the attack immediately ceases, the patient having had an "autogenous dose" of adrenaline. We may hope that the time will come when asthma will be curable, but until that consummation has been attained, the proper use of adrenaline deprives asthma of most of its terrors and makes it possible for every asthmatic to live a life of moderate activity.

The rare condition of *status asthmaticus*, in which severe asthma continues uninterruptedly for days or weeks and may end in fatal exhaustion, can always be arrested by the method of continuous adrenaline injection, which I introduced a few years ago and which has since been found to be equally effective in the treatment of anaphylactic shock. The needle is kept constantly in position, and after an initial injection of a dose which is known to cause no unpleasant symptoms, one or more minums are injected every 15, 30 or 60 seconds, according to the patient's reaction, the rate being varied until it is found how frequently the injection can be made without any unpleasant symptoms arising. The injections are continued, if necessary, for even half an hour or more, relief always follows and generally manifests itself by the patient falling into a deep sleep, which is often the first he has had for several days.

Asthma: Its Causation by Occult Sepsis.

BY SIR WILLIAM WILLCOX, K.C.I.E., C.B., C.M.G., M.D.,
F.R.C.P.

Physician to St. Mary's Hospital

RECENT investigations have emphasized the great importance of some toxic idiopathic factor as the exciting cause of the asthma paroxysms. Attention has been directed to the sensitization of asthmatic subjects to the proteins from various animals, such as the horse and cat or other animals. The feathers of birds may act in a similar manner. The protein of egg, milk, various cereals, such as wheat, oats, peas, beans, etc., may act as a protein antigen. In some cases the presence of parasites in grain has been found to excite attacks. The extraordinary sensitiveness of hay fever and asthmatic subjects to the pollen of certain grasses and flowers is well known. A cutaneous test can be applied whereby the intradermal injection of a minute amount of a special animal or vegetable protein produces in a sensitive subject a marked reaction.

Bacterial Toxins—Just as the asthmatic subject is sensitive to proteins of various animal and vegetable origin, so there is an equal sensibility to the toxins resulting from autogenous bacterial infections. In the study of a considerable number of asthmatic cases during the past ten years, I have been impressed by the great frequency of the bacterial toxic factor as an exciting cause of asthma. In cases met with in adults it has been my experience that sepsis or autogenous intoxication from some focus of infection is much the commonest exciting cause of asthma.

While sensitization to extraneous proteins which

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have an idiopathic toxic action should always receive the fullest consideration and investigation, I am very strongly of opinion that systematic search for occult autogenous sepsis should be made in *every case* of asthma. Where a focus of infection exists in the body, autogenous bacterial toxins are being constantly absorbed into the circulation so that the patient may become sensitized to the absorbed poison and thus be the subject of the asthmatic paroxysms.

SEARCH FOR OCCULT SEPSIS.

In this investigation it is essential that nothing should be left to chance. The apparent absence of any localizing symptoms should not deter the fullest clinical, radiological and bacteriological investigation in every case. It is only by this routine process of search in every case that obscure foci of infection are discovered.

Naso-Pharyngeal Causes—These are of very great frequency in cases of asthma. Abnormal conditions of the nose and throat should be carefully sought for by clinical examination, and the question of occult sepsis or local reflex irritation be given the fullest consideration. Enlarged tonsillar lymph glands or posterior cervical glands often give the clue to nasopharyngeal sepsis. Enlarged septic tonsils, shrunken or irregular tonsils or septic tonsillar stumps may be apparent. Nasal polypi causing reflex irritation and with associated sepsis may be found. In children adenoids with nasal obstruction and toxic absorption therefrom are often present.

An X-ray examination of the nasal sinuses should always be undertaken. I have been astonished by the frequency of occurrence of opacity to X-rays of the maxillary antra in cases of asthma in which no localizing symptoms have existed. The nasal sinuses should always be submitted to expert rhinological

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examination, and the presence of a suspicion of infection from the radiological examination will call for the exploration of any suspected sinus by means of puncture and bacteriological examination of the resulting washings.

Naso-pharyngeal foci of infection may require surgical treatment, such as removal of tonsils or adenoids, or efficient drainage of maxillary antra or other sinuses. It must be remembered that the mucous membrane of the naso-pharynx may show a general inflammation due to infection of the contained lymphoid tissue, and in such cases operative treatment is not practicable, but treatment on general lines, such as vaccine therapy, may be indicated.

Dental Sepsis—A clinical examination of the gums and teeth will reveal evidence of gingivitis, retraction of the gums, carious teeth, septic stumps. A radiological examination of the teeth should always be undertaken, and thus will indicate the presence of periodontitis, apical dental lesions, granulomata, dental cysts, dead teeth. In asthmatic cases it is advisable that any infected teeth should be removed. Dead teeth are always either an actual or potential source of danger, and their extraction is advisable.

Intestinal Sepsis—A careful clinical examination should be made for evidence of enteroptosis, colitis, colon stasis, tenderness over the gall-bladder or appendix. If indicated, an X-ray examination of the whole gastro-intestinal tract after an opaque meal should be made. A colon wash-out with normal saline may reveal abnormalities to the naked eye, such as excess of mucus, parasites. A bacteriological and microscopical examination should be carried out for the presence of any pathogenic infection.

Urogenital Sepsis—A bacteriological and chemical examination of the urine may be desirable. The con-

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dition of the prostate in male adults should be noted. In females the condition of the ovaries, Fallopian tubes, uterus and vagina should be investigated and, if necessary, bacteriological examinations carried out

By a systematic examination in a case of asthma any occult sepsis will be indicated. Should the focus of infection be amenable to surgical treatment, as, for example, removal of infected teeth, septic tonsils or drainage of infected maxillary antra or nasal sinuses, this should be carried out. In cases of asthma such operative measures on foci of occult sepsis have been usually followed, in my experience, by a marked change in the whole aspect of the case. The paroxysmal attacks of asthma usually become much less marked after the local disturbance of the operation has subsided and within a week there is a marked amelioration in the symptoms and in many cases the asthma disappears. Where there is evidence from clinical and bacteriological examination of occult sepsis from some focus of infection and where this is not amenable to surgical treatment, other measures of treatment are indicated. In the case of colon infections the careful regulation of the diet, internal medical remedies, such as paraffin and kaolin, may be indicated. Where no acute intestinal symptoms are present Plombière's colon irrigations from one to three times weekly are of benefit.

VACCINE THERAPY.

This should not be used until a complete clinical examination on the above lines has been carried out and any removable gross foci of infection dealt with. Afterwards vaccine treatment is often of value. A naso-pharyngeal swab, and a specimen of colon washings or other suitable specimen, are submitted to bacteriological examination, and if a pathogenic infection is found a vaccine is prepared.

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It cannot too strongly be insisted upon that asthmatic patients are sensitized to their infections and therefore if vaccine therapy is employed only the smallest doses of vaccine are indicated. It is advisable to use a vaccine of strength not exceeding one million organisms per c.cm. An initial dose of $\frac{1}{20}$ c.cm. (one minim) should be given and the effect observed. The dosage may be increased by one minim at each inoculation, the intervals between the injections being five to seven days.

A course of inoculations may be given, until the final dose is about 1 c.cm. If improvement and relief of symptoms result, the course of inoculations should be discontinued. It is inadvisable to give large doses of an autogenous vaccine in cases of asthma owing to the risk of again sensitizing the patient to the infection.

Other methods of raising the immunity of the patient may be employed, such as change of climate and locality, artificial light treatment, diet rich in vitamins, and special vitamin preparations. If the patient becomes free from symptoms it is advisable to leave well alone, since too energetic measures of treatment may lead to a return of the asthma.

CONCLUSION.

The above article has been written with the view of dealing with the causation of asthma and attempts to deal with the causal infection, no mention has been made of the treatment of acute attacks of asthma, since this subject will be dealt with by other contributors. Sir George Newman, in his Linacre Lecture for 1928, quotes in the conclusion as one of the advances of modern medicine, "The new knowledge of the cause and circumstance of disease and its healing by immunity". This statement seems to have especial application to asthma, since it is only by a true appreciation of its cause and of the healing by immunity that a real and permanent cure can be effected.

The Nasal Factor in the Treatment of Asthma.

By SIR JAMES DUNDAS-GRANT, K B E , M D , F R C S

Consulting Surgeon to the Central London Throat, Nose and Ear Hospital, Consulting Laryngologist to the Cancer Hospital, Surgeon (Throat, Nose and Ear) to the Brompton Hospital

IT was with great surprise that I noticed, in a recent enumeration of the various methods of treating spasmotic asthma, that intra-nasal treatment was not even mentioned. My experience of it leads me to say that the physician who leaves it out of consideration, even if he does not adopt it, in any case of asthma, at all events in any case which does not readily yield to other methods, is not doing his best for his patients. A very experienced physician and authority on diseases of the chest said to me that it was the only treatment that offered the prospect of cure. He told me that when a young but well-established rhino-laryngologist, who had patriotically sacrificed his practice in order to serve in the Great War, returned and found himself without any patients and asked him what he should do, he told him that if he would resect a few deflected septums for asthma he would soon recover his practice. Some unwarranted scepticism seems to have arisen from a wrong interpretation of the conclusions arrived at in a discussion on the subject in the Laryngological Society of London, in 1899. This will be dispelled by a study of the opinions expressed as shown in the full report as it appears in the published *Proceedings* of that society, volume vi, p 88. Dr. McBride's well-weighed statements and conclusions are worthy of special consideration.

Without wishing in any way to belittle the value of other methods, I venture to claim for the intra-nasal

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treatment that in appropriate cases it can effect enormous relief and even in some cases cure when the other methods have failed to do so

The experiments of Dixon and Brodie and of Ransom¹ prove beyond question that *stimulation of the mucous membrane of the nasal septum, especially in its upper and back part*, can cause a loss of expansion of the lung, which are attributed to a contraction of the bronchial muscle, a very convincing explanation. This points conclusively to the responsibility of the nose for many cases of asthma, while the localization in the upper and back part of the septum indicates the possibility of the exciting pathological condition being present even when freedom of nasal breathing might lead the general physician to assume that the nose was normal.

The results reported by Dr Francis, from lightly cauterizing the septum, afford evidence of the participation of the nose in the production of the asthmatic spasm. This treatment appears to be most effective in cases in which there is no obvious organic intra-nasal disease.

An investigation with the nasal speculum should, therefore, be included in the clinical examination of any asthmatic patient, especially if no obvious non-nasal cause is found, or if the case does not answer to non-nasal treatment. In such cases there will often be seen hypertrophy of one or both middle turbinate bodies (solid or cystic), polypoid outgrowths from this body or from the ethmoidal cells coming into contact with the septum, or else a deviation or swelling of the upper part of the septum meeting the turbinate body.

It is equally certain that a nose may be completely stopped up with polypi, and yet no asthmatic symptoms be present. This may mean that the portion of the nose specified by Dixon is not encroached upon, or that the asthmatic predisposition is absent. I believe

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that a local condition favourable to the development of the attack is a variable rather than a steady pressure on the part. Such variability is present in the turbinated bodies which swell and contract under the action of normal and abnormal stimuli. Similarly the removal of a polypus leaving a floating tag, or allowing another more mobile polypus to come out of a recess and "tickle" the sensitive part of the septum, may be followed for the moment by an exacerbation of the asthma.

I admit that I have examined noses in which the conditions were present which seemed likely to excite the asthmatic attack, but with no history of it. In these cases some other essential factor is wanting, namely, an asthmatic predisposition as such.

Among the most striking instances of the need for careful nasal examination are the distressing cases of young children suffering from unmistakable asthma. Such children are not infrequently referred for removal of their tonsils and adenoids in the hope that this will be followed by relief from their asthma. The result is often quite disappointing until, on careful examination, *the middle turbinates are found to be enlarged*, often to an extraordinary extent, the removal of the redundant portion, the anterior part or "head" as it is named by the French, resulting in a disappearance of the attacks, with restoration of power to run and to play, and even to resist the effluvia of horses and cats previously unbearable.

The operation of submucous resection of the septum is often surprisingly effective, but it sometimes fails because, while the resection has been carried out very thoroughly in the lower part, *it is the upper part which has most specially to be dealt with*. A second operation extending as high as possible is then often most efficacious in dispelling the affliction. Failure to check the asthma, even after a most skilful and complete sub-mucous resection, may result from a want of co-

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aptation of the two membranous layers of the septum. This shows itself by a bagginess of the soft tissues producing a swelling on both sides of the upper part of the septum coming in contact with the middle turbinate bodies. The treatment I have found effective in such circumstances is stitching the layers together by a suture put through and through, and retained *in situ* for four or five days.

In THE PRACTITIONER for June 1913 and for December 1927, I discussed the question of nasal disease in relation to asthma, and in the latter have described the conditions found in seventeen consecutive cases referred to me as suffering from asthma. Two of them came into the category of neurotic dyspnoea and were not genuine asthma at all. In the others the nasal element and the beneficial result of its elimination were unmistakable.

In the articles just mentioned the results of several series of consecutive cases seen in hospital practice were tabulated.—

In the former, in a total of fifty-two cases there was —

Recovery	-	-	-	-	-	-	-	11
Improvement	-	-	-	-	-	-	-	32
No improvement	-	-	-	-	-	-	-	10

In the latter article, in thirty-eight cases the results were

Recovery or great improvement	-	-	-	-	-	-	15
Moderate improvement	-	-	-	-	-	-	16
No improvement	-	-	-	-	-	-	3
Doubtful (no obvious nasal trouble)	-	-	-	-	-	-	4

In a more recent series of thirty-three cases in hospital practice, referred on account of asthma, the results were obtainable in twenty-nine. Of these there were —

Recovery	-	-	-	-	-	-	-	7
Great improvement	-	-	-	-	-	-	-	13
Moderate improvement	-	-	-	-	-	-	-	6
No improvement	-	-	-	-	-	-	-	3

The three who were not improved had failed to

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attend for the necessary intra-nasal treatment, one having nasal polypi on one side and hypertrophy of the anterior lip of the hiatus semilunaris on the other, another nasal polypi, enlarged middle turbinate bodies and deflection of the septum, the third enlarged left middle turbinal, polypus and deflection of septum

Gratifying as these statistical results were in the circumstances of hospital work, they seemed to me less favourable than my observation of the individual cases led me to expect. I therefore investigated the consecutive series of private cases numbering seventeen. Two of them were cases of neurotic dyspnoea. In the remaining fifteen the results were —

Recovery	-	-	-	-	-	-	9
Great improvement (treatment incomplete)	-	-	-	-	-	-	3
Considerable relief (treatment incomplete)	-	-	-	-	-	-	1
Results unobtainable	-	-	-	-	-	-	2

In most cases an ointment containing anæsthesine and adrenaline was prescribed, which in some gave so much relief that more radical nasal treatment was deferred or refused.

If patients always returned to have the finishing touches as recommended, the number of the successful cases would have been still higher. It has also to be remembered that redevelopment of polypoid outgrowths is not an infrequent occurrence, and that a repetition of the operative removal may be called for, the amount of interference required being less the earlier the time at which the re-growth is detected.

In carrying out intranasal treatment it is necessary to rob it as much as possible of its inevitable discomfort and, therefore, *to centre one's attention on the parts from which the reflex bronchial spasm is most likely to be excited, namely, the upper and back part of the septum*, removing with the utmost delicacy the objects which are apt to come in contact with it. The most

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obvious are enlarged or polypoidally (gelatinously) diseased middle turbinated bodies. Polypi may lurk in the middle meatus—between the middle turbinal and the outer wall of the meatus—without irritating the naso-palatine nerve unless they overflow into the meatus and find their way between the turbinal and the septum or by their enlargement press the former inwards towards the latter.

The typical operation consists in punching a notch in the narrow part of the visible middle turbinal, then passing a snare over the peninsula thus formed and cutting it off by tightening the wire. The portion detached usually comes away with the snare and in the adult is not likely to be inhaled or even swallowed, especially if the patient is sitting up and under local anaesthesia only.

In the young child, and a young child in an attack of asthma is a pitiable object, such treatment is called for with a fair degree of frequency. The operation has to be done under a general anaesthetic if only because the dilatation of the little naris has to be stronger than in the adult and, therefore, necessarily painful.

The main points about the operation in the child are the free dilatation of the naris with Killian's short nasal speculum, the notching of the middle turbinal and the snaring off of the peninsula, the utmost attention being centred on catching the detached portion before it drops back, as it is very apt to do. For this purpose a sharp steel foreign-body hook is put with the utmost promptitude into the hand of the operator, who instantly makes a dash for it with the hook which catches into it with wonderful tenacity and ease, even if the part is considerably concealed by the blood.

If a dexterous assistant is available the following is a very excellent plan of action:—The operator opens the nostril with the dilating speculum in his left hand, notches the turbinal with the Grunwald punch (a

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specially flat model is desirable), quickly adapts the snare which he then entrusts to the assistant, then inserts the hook into the turbinate body and directs the assistant to tighten up the snare without drawing the point of the shaft forward away from the notch in the turbinal. It is obvious that if the point of the snare is pulled forwards instead of the wire alone being drawn in, too small a fragment will be removed. The fragment is then drawn out with the hook, and a strip of ribbon gauze smeared with parolene or covered with a thin rubber finger-cot is inserted. The foreign-body hook (here illustrated) speaks for itself, but I may



FIG 1.—Foreign-body hook (half-size)

mention that it is made of fine steel and is at its point bent in a rounded right-angle for about one-sixteenth of an inch. The handle is bowed or made as in the illustration. For the present purpose the point is turned downwards, but it can be rotated and fixed in different positions.

The portion which touches the septum may be quite small and situated far forwards, when it may be punched off with a flat punch. In some cases it suffices to press the middle turbinal outwards away from the septum with sufficient force to fracture it, in others the titillating portion may be small and succulent enough to shrivel under the action of a fine galvano-cautery point.

I have referred to relief often afforded by the application of an ointment of anæsthesine twenty grains, vaseline two drachms, solution of adrenaline twenty minims, and liquid paraffin two drachms. The combination of anæsthesine and adrenaline seems a peculiarly happy one, and if anæsthesine could be dissolved in some bland vegetable or mineral oil to a much higher

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degree than at present seems possible, a spray containing these two drugs would be more convenient than the ointment. The adrenaline with the anæsthesin diminishes the vascularity and the turgidity of the parts, thereby relieving the mechanical pressure, while itself acting directly, even if only to a moderate extent, on the dilator muscle of the bronchi. There is evidence of so much relief being obtained that intra-nasal operation has in some cases been deferred. The breaking of the vicious circle, if only temporarily, may well have had a beneficial psychological effect on such susceptible subjects as the sufferers from asthma.

The exceptional opportunities afforded in the throat department in a large hospital for diseases of the chest for studying cases of asthma, especially in relation to the nasal disease, have provided ample proof of the great frequency of their association.

Dixon's experiments seem absolutely convincing, and treatment carried out on the lines that these experiments indicate has proved of the highest value. Cases in illustration of this view can be seen at almost every session of the throat department of Brompton Hospital under my own care or that of my colleague, Mr. Ormerod.

Intra-nasal operative treatment is in some severe and long-standing or neglected cases admittedly trying to both the patient and the operator, though it is often in such cases that the ultimate results are most striking. On the other hand, in very many cases the nasal disease is slight and limited, and the treatment quickly, safely, and not too unpleasantly carried out. I would instance the case of a talented lady referred to me by my late colleague, Dr. Perkins, on account of her asthma. The nasal condition was a gelatinous polypus growing from an enlarged middle turbinated body, the latter pressing closely against the septum. Under local anæsthesia I was able, without undue strain on her

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artistic sensitiveness, to remove the redundant portion of the turbinal with the polypus attached to it. From that time she became free from her asthma, and has continued to follow her artistic vocation in comfort. Such experiences need not be uncommon if the nose is submitted to examination early in the course of the disease, as it was in this case. It would have been deplorable, had the condition not been discovered and removed in good time.

Without suggesting that the nasal condition is the only cause of the asthma, and intra-nasal treatment the only one worth adopting, I venture to reiterate my statement that the medical adviser who omits to consider the question of an intra-nasal cause, at all events in cases which do not readily answer to other treatment, is withholding from his patient a very important means of obtaining relief or even cure.

Reference

¹ *Trans Path Soc Lond*, vol lv, p. 17, *Journ. of Physiol.*, vol xlvi

The Diagnosis and Treatment of Climate Asthma.

By PROFESSOR W STORM VAN LEEUWEN

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A BOUT 90 per cent of all patients with bronchial asthma, who come under treatment in Holland and countries of similar climate, belong to the group of allergies, i.e. their symptoms are caused by the action of substances (allergens) which excite symptoms in them, but are harmless to normal people. Some of these allergies are hypersensitive to various foodstuffs, or belong to the group of "bacterial sensitization," but 90 per cent of them are hypersensitive to allergens in the air, which are absorbed by the mucous membranes of the air passages. The most important factors in this last-mentioned group are allergens, called by me climatic-allergens (or miasms), which consist of products of destruction of micro-organisms, moulds, and insects (among the last, mites being important) which occur for the most part inside our houses. Animal hair or dandruff, and feathers from pillows and mattresses in moist houses, also play a part in the production of allergens. The evil influence of moist climate, moist soil and high level of ground-water on asthma (which has been statistically shown by me, and later by Tiefensee for East Prussia) is ascribed to the fact that in houses built on a moist soil with high level of ground-water the opportunities for growth of micro-organism will be much more favourable than on a soil consisting of sand, rock or chalk.

Proof of the correctness of the explanations has

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been provided in several ways. Among other things it can be shown that more than 90 per cent of our asthmatics give positive skin reactions with an extract of the epithelium of the human skin, whereas in normal persons this reaction is practically always negative. This fact has been confirmed completely by Feinberg in America, and by Rost and Keller in Germany, these authors have prepared their extracts in the same way as we have, and have applied them in the correct manner. Kammerer does not find the reaction so specific as we do, but his method differs slightly from ours; he, however, finds the reaction eighteen times stronger in asthmatics than in normal individuals.

Statistics have shown that 70 per cent of all asthmatics going to a high altitude (such as Davos) become free from all symptoms within three days, whereas another 20 per cent. are distinctly improved in a few weeks without any other treatment. We have proved that the influence of a high altitude may be traced back to the absence of climatic-allergens there. We found that the prevalence of the house-dust allergen (an allergen first discovered by Coke, the origin and identity of which is still unknown) decreases with increasing height above sea-level. This house-dust allergen is a very important factor for asthmatics in Holland and countries of similar climate. Eighty per cent. of our asthmatics react with a positive skin reaction to this allergen, and we have found, with one exception to be mentioned below, no difference between Dutch patients and those from other countries. In a recent study we collected samples of dust from private houses in Sweden, Germany, Austria, Poland, Italy, France, England and Holland, and tested them on Dutch asthmatics. We found that all these dusts gave rise to positive reactions in our asthmatics, hence they probably contain a common allergen of unknown origin. It was shown that house dust from places known to be "good" for climate

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cases of asthma—as, for instance, Berlin and London, and a small region in the centre of Holland—contains much less allergen than dust from places known to be bad—such as Dresden and low regions in Holland. Dr. Schrotter, in Dresden, examined his asthmatics with an extract of house dust from Holland and found 80 per cent with positive reactions, this being in complete accordance with our findings in Holland.

A further proof of the correctness of our conception of the relation of climate and climatic-allergens was obtained by making observations on a large number of asthmatics observed during residence in our so-called allergen-proof chamber. The installation of such chambers in our clinic for allergic diseases was based on our view that the bad influence of a moist climate and a moist soil depended on the quantity of climatic-allergens occurring in the houses of such regions, and we expected that asthmatic patients of the climate type should be free from attacks, even in such a moist climate, if they could be guarded against climatic-allergens during the night and part of the day. In order to obtain proof for this suggestion we rented two old private houses in a moist region of the country (Leyden), and in some of the rooms of these houses we erected small air-tight chambers, built of an asbestos material (etermite) which prevents the growth of micro-organisms. These chambers contain iron beds, capoc mattresses, capoc pillows and woollen blankets, which have been sterilized before use and are disinfected again every two months. The simple type of allergen-proof chamber is ventilated with air taken from a height of about 35 metres above the soil and blown into the clinic through metal pipes by means of a large exhaust with a capacity of 1,800 cubic feet per minute. This air is heated before entering the chamber. In some cases the outside air has to be purified, which is done by cooling the air, so that it loses the greater part

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of its water, which, during the process of condensation, removes the impurities from the air. This procedure of cooling is only seldom necessary, and as a rule the simple system is sufficient.

About 80 per cent of eight hundred patients observed in these allergen-proof chambers up to now have been free or practically free from asthmatic symptoms after residence in the chamber for about three or four days. They are allowed then to leave the chamber during the daytime, to go out and do what they like, if only they sleep in the chamber and, if possible, stay there during the evening. Another group of patients is only partly relieved by residence in the chamber, so that other measures, such as regulation of the diet and non-specific treatment, have to be applied. About 10 per cent. of our patients do not react at all to residence in the chamber. This figure is in accordance with the figure from the statistics of high altitude.

These findings have proved the correctness of our conception of the influence of climate-allergens on asthmatics, but the question now arises. What are the therapeutic consequences of this conception? Of course, the patients are not *cured* by staying for some days or weeks in the allergen-proof chamber, besides, we know also that residence in a high altitude, even during longer periods, does not, as a rule, cure the asthma. In order to get permanent relief of his attacks the allergic belonging to the large group, who are favourably influenced by residence in the allergen-proof chamber, should have an allergen-proof installation in his own house and *use it permanently*.

The practical application of this method has been worked out by my colleague, Dr Einthoven¹. Up to the present fifty installations in private houses have been in use during periods varying from 3½ years to six months. All these patients use the chamber only during the night and behave like normal people during

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the daytime. Recently, Dr. Tissot van Patot made a survey of these fifty cases, and the results have been published by him and the present writer. Of these fifty installations, twenty-five belong to an older type in which technical mistakes had been made, consisting for the most part in the application of a wrong heating system. In this series were five failures, eleven complete and nine almost complete successes. In the second series, in which the installation was technically correct, only one failure occurred, and that was a case of hysteria, which was not rightly interpreted by the writer. All the other twenty-four cases became completely free from attacks and behaved like normal people, whereas they had been invalids or almost invalids before.

Those patients who cannot afford the installation of an allergen-proof chamber in their houses have to be treated in another way. First, we give them indications for the improvement of their bedding, bedroom, sitting-room, and the rest of the house. All furniture which may contain too many allergens must be removed from the bedroom, and, if possible, from the sitting-room, and the bedroom should be well heated so as to make it as dry as possible. These indications are often of great importance, but, as a rule, they are not sufficient. Consequently, we try to desensitize our patients against all allergens to which they show positive reactions. The most important allergens in this connection are the house-dust allergens mentioned (products of moulds, bacteria, mites and other insects), products of animal hair, dandruff or feathers, and in a number of cases products of bacteria, causing chronic infection of the air-passages.

This desensitization, which consists of injections of very small doses of the allergens—gradually increasing the dose—may be applied during ambulatory treatment. We have observed quite clearly, however, that

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specific desensitization with *some* of the climate-allergens—among which the house-dust allergen is the most important—is impossible and even dangerous, so long as the patient is permanently exposed to the influence of the allergens, whereas the desensitization may be applied with ease, if during the period of treatment the patient is protected against the action of the allergens. This protection is offered by the allergen-proof chamber in the clinic. Hence one of the great advantages of the allergen-proof chamber is that it offers the possibility of specific treatment in a large number of cases in which such treatment would otherwise have been impossible.

The allergen-proof chamber has three advantages. First, it makes it possible to obtain within a few days a differential diagnosis between those cases which are largely due to factors of climate and those cases which belong to other groups, secondly, it may serve to obtain a permanent relief from asthmatic attacks if the allergen-proof installation is built in the house of the patient, thirdly, it opens up the possibility of specific treatment in a number of cases in which this treatment would otherwise be impossible or even dangerous.

According to our view the efficient diagnosis and treatment of bronchial asthma is impossible without employing an allergen-proof chamber. The correctness of this view has been accepted by a number of clinics in Germany, Austria, Portugal, South Africa and Japan, which now have allergen-proof installations. The importance of those installations, especially for the diagnosis and treatment of working people, has been realized by some of the *Landesversicherungsämter* in Germany, which have, up to the present, allergen-proof installations in ten of their *Heilstätte* (clinics). The total number of allergen-proof chambers in Germany and Austria exceeds fifty.

It may be mentioned that the system of the allergen-

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proof chamber has been shown to be of value in the treatment of tuberculosis. The influence of climate on the condition of the tuberculous patient is of considerable importance. We have shown that in this case also climate means the occurrence or the absence of climatic-allergens in the air. This extension of our method of treatment will certainly be of the greatest importance during the coming years. Incidentally, it may be pointed out that severe attacks of pertussis cease within a few hours after admittance to the allergen-proof chamber ventilated with purified air.

One final remark should be made. More than 80 per cent. of the asthmatic patients admitted to the clinic of the writer are benefited by residence in the allergen-proof chamber. Most of these patients are Dutch or Germans, observations which were able to be made on a restricted number of patients from other countries (among which are England and South Africa), showed that the same factors that influence asthma in Holland are *principally* active in other countries. A *quantitative* difference, however, is to be anticipated. It may be clear, from the facts stated above, that those patients will be most influenced by residence in the allergen-proof chamber who have a great deal of climate-allergens in their own houses. Climatic-allergens are found for the most part in moist regions with a wet soil and high level of ground-water, and, as a matter of fact, the houses of the poor will contain more allergens than the houses of the more comfortable classes. Consequently, the conceptions set forth above are applicable in moist countries chiefly to the poor, and much less to well-to-do people in places with a good soil.

I find that on an average 80 per cent. of my cases are pure climatic cases, i.e. are free from attacks simply through residence in allergen-proof chambers (by the avoidance of climatic-allergens), but among the labouring classes in the low-lying parts of Holland the

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percentage would be more than 90, and in some regions of Holland would reach almost 100. On the other hand, if statistics were made from cases in good circumstances, in Berlin or London (Berlin being built on Kieselguhr, London on chalk), the percentage would be lower and would probably be below 50.

Consequently, the proper places to start clinics with allergen-proof chambers are those regions with a moist climate, but, above all, districts with a moist soil and a high level of ground-water. In other districts these chambers may also be of considerable value, but there the number of *pure* cases of climate asthma will be fewer, so that other therapeutic measures—such as vaccino-therapy, non-specific treatment, regulation of diet—will often have to be employed and may even be the principal therapeutic measures.

Reference.

¹ These installations are now made by F. Blukers, Schiedan, Holland, and by Schmelz, Wachwitz, near Dresden, Saxony.

The Origin of Spasmodic Asthma.

By PROFESSOR W E DIXON, M.A., M.D., F.R.S
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SPASMODIC bronchial asthma is due to constriction of the muscles of the smaller bronchioles; the evidence that it is caused by an obstruction to the air-way is definite and complete, both on the experimental and clinical sides, and were it not that in recent times other modes of obstruction besides that of muscular contraction have been suggested as the essential cause, this part of the subject might be dismissed without discussion. Sudden and excessive secretion and vascular engorgement of the mucous membrane are the two principal alternatives. The first of these views is hardly tenable, oftentimes expectoration is absent and the characteristic features of the attack are much more compatible with a restricted but clear air-way than with one due to an accumulation of secretion in the tubes. Inflammatory conditions and bronchitis are common secondary effects, though sometimes the bronchitis may be chronic and associated with recurrent attacks of asthma, a condition not uncommon in children.

The second alternative is that the obstruction to the air-way results from vascular engorgement of the bronchial mucous membrane similar to that which occurs in the nose. The mucous membrane over the inferior turbinate bones and lower nasal passages is very vascular, and in parts venous plexuses occur encircled by bundles of muscle fibres. The mucous membrane in the bronchioles, on the contrary, is thin and has a relatively insignificant blood-supply. I have

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several times, in cats and dogs, ligatured the pulmonary vein issuing from a lobe of the lung, but have never seen anything in the least comparable with the restricted air-movement observed when the bronchioles contract, anatomically I think any considerable degree of vascular engorgement is impossible. It is not suggested that during the attack the pulmonary circulation is uninfluenced, the partial asphyxia and the forced movements of respiration produce an increase in the blood content of the lungs, a condition which can readily be measured in cats and dogs, but this is secondary to the asthma. Observations with the bronchoscope during the attack are also of little value, the trachea, bronchi and largest bronchioles do not, indeed cannot, contract appreciably, and the constriction is confined to the smaller bronchioles, all the bronchoscope tells us that during and after the attack the superficial blood-vessels are dilated and the mucous membrane is somewhat swollen. The evidence all points then to asthma being a bronchiolar muscular constriction.

The mechanism of this constriction has been so clearly set forth that a description here would be out of place. The broncho-constrictor fibres are confined to the vagus¹ and the broncho-dilator to the sympathetic,² one feature of interest in the latter innervation is that although most of the sympathetic fibres proceed through the rami of the first, second and third dorsal nerves, a variable number pass down the cervical sympathetic, and stimulation of these nerves in the neck produces broncho-dilatation.

Another feature which requires some comment is the over-distention of the lungs, which is so prominent a feature of the acute attack. Under normal conditions the force of inspiration is much greater than that of expiration, and it is possible by effort greatly to increase the force of both inspiration and expiration.

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The mechanics of the thorax permit a more decided increase of the power of inspiration over that of expiration, for the thorax is essentially an inspiratory apparatus, and the elastic recoil of the distended alveoli and pulmonary tissues which is mainly responsible for deflation is in comparison but a feeble force; so that in spasmodic asthma the difficulty of expiration is responsible for the distention. Moreover, the greater the degree of distention the feebler is the power of deflation, the proof of this can be shown both by figures and experiment, if one lung of a dead animal is widely distended with air and the other lung is half distended and if the trachea and bronchi are clamped by three separate clamps, on removing the two bronchial clamps the half-distended lung empties into the more widely distended. During the attack of asthma it is the inspiration which is violent, not the expiration.

Bronchial spasm can be produced in animals by exciting afferent nerves or certain tissues, such, for example, as the central end of the vagus, the surface of the cornea, or the mucous membrane of the nose.³ In my experience the most profound effects may be produced by exciting the mucous membrane of the nasal septum high up and well back. If such a faradic stimulation be made in a dog, constriction follows; compared with direct vagal stimulation it is slow in onset, is gradual in progress, and much more permanent in character, that is, when the stimulation ceases recovery is very slow, occupying several minutes. Clinical records show definitely that operative treatment on the nose is responsible for many cures. Dr Greville MacDonald once told me that the most favourable cases for operation were those in which sneezing was a prominent symptom, while Francis and others obtained, at least for a time, remarkable results by cauterizing the nasal septum, and it is stated that in many of the successful cases nothing abnormal was

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seen on the area cauterized. The explanation is, of course, that the operation destroys supersensitive areas, rendering the patient less liable to reflexes. All operations, whatever their nature, exert a physical influence, but this will be discussed later.

Before leaving the question of the mechanism of bronchial spasm it may be mentioned as further evidence as to its nature that the sympathetic stimulating drugs adrenalin and ephedrine, which relieve most cases, cause not only wide broncho-dilatation, but intense pulmonary congestion;⁴ and that the drugs which diminish medullary reflexes, such as morphine, relieve bronchial spasm just as they do cough.

I believe that the evidence shows that practically all cases of asthma are due to the reflex stimulation of the medulla, whether this be so or not, the effect must be due to medullary stimulation direct or reflex, or to some circulating poison so specific in nature that it acts upon the peripheral neuro-muscular apparatus of the bronchioles, leaving other neuro-muscular apparatus in the body relatively unaffected. Foreign proteins or "allergens" are supposed to obtain access to the body, and in the supersensitive produce an attack of asthma. The evidence in support of this view is not convincing, those who regard asthma as an anaphylactic phenomenon so often base their views on what happens in the guinea-pig that it is well to emphasize that these animals are the only ones especially susceptible to asthma as a feature in anaphylaxis. The bronchioles of the guinea-pig are different from those of all other animals, in that they are lined with highly-vascular mucous membrane, which is loosely arranged in folds from which villi project into the lumen of the bronchiole. Guinea-pigs are very easily killed by asphyxia in anaphylaxis, due to the intense vascular swelling of this mucous membrane. Anaphylactic conditions in dogs and cats are characterized by a profound fall

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in systemic blood-pressure and by pulmonary congestion, and in man probably by the same condition

Pronounced blocking of the air-way is seen only in the guinea-pig. Anaphylaxis in man, of unquestioned origin, is a very rare condition, and its manifestations are not those of asthma, Ebbecke states that the commonest effects are a rise of temperature, skin eruptions, oedema, pains in the joints, and occasionally dyspnoea.⁵

To define asthma in the words of a recent textbook as an anaphylactic manifestation of recurrent bronchial spasms in sensitized individuals is to evade the difficulty. This view, however, has many adherents in the profession, especially amongst pathologists, and it is not uncommon to make skin injections of proteins and other substances into asthmatic patients with a view to determine to which the patient is supersensitive by excessive skin reactions. Those patients who react (about 50 per cent.) usually do so to several substances, and it is not necessary to be an asthmatic to react. The degree of reaction varies from time to time in the same patient, according to his condition, and there is certainly nothing specific in them in the sense that tuberculin is specific in tuberculosis. This skin reaction is a local axon reflex and is not produced even in a supersensitive person if the part is first anaesthetized with a local anaesthetic, so that reactions probably mean little more than that the skin axon-reflexes from the sensory endings to the blood-vessels are exaggerated. Certainly they afford no evidence of anaphylaxis, but only that some hyperexcitability of nerve-endings is present, and if in the skin probably in the mucous membrane of the nose also.

The skin can be rendered supersensitive to many substances which are not antigens. A drop of 1 per cent mustard gas placed on the skin produces a local reaction only, but if the experimenter persists in so

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burning himself, in a few weeks he becomes supersensitive, and that to such a degree that the mere presence of an open bottle of the substance in the laboratory may suffice to produce a general erythema. It is suggested that the various foreign substances found in dust, pollen, fungi, hairs, and the like may in the supersensitive induce considerable irritation or stimulation of the fifth nerve endings in the nose and that this is all that is necessary in an asthmatic patient to initiate an attack. Storm van Leeuwen adopts this principle in his treatment of patients, of which an important part is sleeping in a dust-free atmosphere, he regards skin reactions as of little significance, and he "desensitizes" his patients by shock tactics with injections of sulphur, milk or tuberculin.⁶ There is plenty of analogy to this supersensitivity of nerve-endings to drugs. One example will suffice adrenaline dropped on the conjunctiva of normal people has no effect on the pupil, because so much is destroyed by oxidation during absorption. But in one stage of pancreatic disease the sympathetic system becomes supersensitive, and adrenaline dropped on the conjunctiva of a patient in this stage dilates the pupil (Loewi).

Many may be supersensitive to skin and nasal stimuli, but few are asthmatics; a neurotic factor is also required. Hurst defines asthma as a reaction of an over-excitable bronchial centre, the evidence in support of this is convincing, both by its amount and quality. Heredity plays an important part, according to the literature neurotic factors of one or other kind are present in most asthmatics, and these have received full discussion by many writers.⁷ Hutchison, referring to children, states that the disease is one of the child as a whole, and that the treatment must aim at breaking the asthmatic habit. The importance of this, I think, can hardly be over-estimated, the attacks recurring at frequent intervals assume what may almost be

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regarded as a conditioned reflex like the cough in pertussis, which may continue long after the cause has disappeared.

Several years ago I attempted to render a dog tolerant to morphine, after each injection the animal vomited, and a time came within a few weeks when the mere preparation for injection and the sight of the syringe was sufficient to induce the vomiting reflex. One other example I will give to show the profound influence that suggestion may exert, the late Dr Rivers and I made some experiments with the ergograph on men whose output of work under precise conditions was measured daily. The effect of administering caffeine on certain days was greatly to increase their work, as we thought because of the alkaloid. This, however, was not so, the cause of the increase was associated with the taking of a drug, and the drug day had assumed an exaggerated importance in the mind of the workers; the administration of any coloured fluid had a like effect.

The cures of asthma and the methods of treatment are as varied as the speculations concerning its ultimate cause, but as they help in understanding the condition I will briefly refer to one or two. The American reports (Stout) state that 26 per cent of asthmatics showed pathological conditions of the skull and sinuses, and that only 16 per cent were without some abnormal thoracic changes (Manges and Hawley). Stout says that 20 per cent of the cases had antritis, 16 per cent. ethmoiditis and 24 per cent nasal polypi; these are conditions which, at all events, may be regarded as predisposing. Operations on the nose, whether by cauterizing or removing growths, may be followed by a cure. Indeed, the most diverse kinds of operation are often followed by a cure. Gobell got cures either by resecting the vagi or by double sympathectomy,⁸ though, excluding psychical effects, it is difficult to understand

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how the latter could be effective.

Psycho-analysts say that they cure most of these cases by analysis and hypnotism. Loewenstein claims thus to relieve two-thirds of all asthmatics, E Moos⁹ states that those of his patients who had presented supersensitivity to certain substances before psychoanalytical treatment, later lost this supersensitivity; if this be so, it is further evidence that such reactions are not specific, but form a part of the patient's general condition.

Cures may be effected by keeping the bronchioles dilated for two or three months by daily doses of ephedrine, if the patient remains free from attacks during this period it may be that the "conditioned reflex" will be broken. This principle of treatment is appreciated by the physician, as is evidenced by the adage that asthma is best cured by not having it.

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Tissue Damage as a Factor in the Asthma Syndrome.

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NO man knows the full pathological mechanism of the asthma group of diseases, nor, for that matter, of any other disease, but certain factors of that mechanism are recognizable, and trauma seems to be one of these. Just as rheumatism tends to show itself in a damaged joint, so any of the asthma group—asthma, urticaria, eczema, epilepsy, etc., may have the site and character of the manifestation determined by some previous tissue damage.

Histamine, Tissue Damage, and Dermographia—Damage, if recent, produces chemical changes in the tissues which *a priori* are likely to augment any asthma-like reaction. Lewis has shown that the effect of histamine in the skin is similar to, he thinks identical with, the phenomenon of dermographia. He analysed the phenomena with minute care and found them to be surprisingly complicated, but in all these complications dermographia and the action of histamine run parallel.

Dermographia and the Asthma Syndrome—Dermographia, if it can be called a disease, almost certainly belongs to the asthma group. (1) Its heredity connection or its coincidence with that group is very strong, as anyone who has handled large numbers, say, of hay fever cases will bear witness, (2) Dr R. Hare, in my laboratory, has shown the extremely close relationship—he would like to say the identity—of both histamine and dermographia reactions with positive dermal reactions in a protein-sensitive person,

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e.g. the hay-fever patient, the horse asthmatic, or the egg-sensitive, (3) in actual experience dermographia and a protein dermal reaction do "summate." Often on carrying out skin tests the control scratching and all those giving a negative reaction show the raised weal and surrounding erythema of typical dermographia, while any positive dermal reactions will merge with this to show extra large weals and an erythematous blush. The two have merged so completely that to estimate the extent of the positive dermal reaction one has to deduct what may be expected to be due to the dermographia.

It may then be assumed that if any histamine-like or dermographic factor is present in the skin at any given area when the body is trembling on the brink of an "asthmatic" attack, we may anticipate some skin symptom—eczema, urticaria—especially at that spot. It is the purpose of this article to prove that not only is this true of skin manifestations, but of all the toxic idiopathies—all the symptoms of the asthma syndrome.

Symptoms at Point of Contact with the Protein— If a protein irritant comes in contact with the tissues of a susceptible person one would expect the point of contact to show symptoms, and, of course, such is largely the case. The hay-fever subject gets conjunctivitis, he breathes in pollen and sneezes in consequence, his mouth and throat (if he is a mouth-breather) tickle and get inflamed. A hay-fever girl with a scratch on the shin walks through grass in June and the scratch becomes puffy and inflamed. To take another instance. A child who is very egg-sensitive will get blistered lips where the egg protein comes in contact with the mucous membrane of the lips, he will feel the protein scorch his throat, and if the irritant be allowed to reach the stomach there will be vomiting and diarrhoea. Such "localization of symptoms" is as obvious as the localization of damage from a blow with a stick.

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Artificial dissemination of Protein irritant in the blood.—But what happens when the irritant (the pollen, let us say) gets from the point of contact into the blood-stream and is broadcast all over the body? We know that the irritant when mixed *in vitro* with the serum of a corresponding susceptible will form an "urticarial mixture," i.e. will tend to form serous effusions wherever and into whomsoever it goes. When this occurs spontaneously *in vivo* the urticarial mixture must be very dilute; we would have expected a mild diffuse action, but this does not happen, and we get instead marked action in selected areas. We must suppose that there is a general resistance locally, but that the body gives way at weak points. Coca thinks that reactions will occur in any part which has become sensitized through previous contacts with the protein: in the bronchioles, i.e. asthma; in the skin, i.e. eczema, etc., in the brain, e.g. migraine, and so forth. As against this it is difficult, I think impossible, to demonstrate a sensitizing effect of, let us say, pollen on a hay-fever subject's skin; an area which has been made to react time after time by repeated injections of pollen will react no more strongly or more quickly to succeeding injections. To take the problem from another angle, many sensitive persons seem to be sensitive to a particular protein the very first time they meet it. In such cases, no area therefore can have been sensitized previously. This paper maintains that trauma is much more likely to be the local "precipitant" of the asthmatic manifestations.

Let us ask again what happens when the protein irritant is broadcast into the blood-stream? This may happen when an over-bold dose (let us say of pollen vaccine in the case of a hay-fever subject) is injected directly into the blood-stream, or reaches it *via* the lymphatics from a hypodermic injection. According to Coca's sensitization theory the patient should sneeze

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and show conjunctivitis—in fact, present the usual symptoms of hay-fever. This does not happen except at midsummer, when one may expect some air-borne pollen to be on the mucous membrane or conjunctiva.

What actually happens from an overdose of pollen in one of the off-months (August to April) is most often or first of all an urticaria, and it is noteworthy that this is likely to manifest itself first or most strongly on some recently damaged point—the site of a scratch, a furuncle, a blow, a hot fomentation. In certain areas, e.g. eyelids or lips, or in any recently damaged spot, this urticaria is likely to go on to angio-neurotic-oedema. In addition to the skin symptoms there may be asthma, migraine or epilepsy, but in these cases there will have been a previous tendency to such symptoms, i.e. according to the thesis of this article there is past damage in the regions involved. Certainly on these occasions the migraine symptoms seem to be more pronounced in cases of eye-strain. I have seen a damaged joint (knee, heel or wrist) receive a temporary serous effusion, which one must call paroxysmal hydrarthrosis. Cases of serious overdosage show a heavy "physiological" albuminuria, but opportunities for observing this are much too rare to tell whether this is more marked in people with damaged kidneys.

Beginning of the Asthmatic History.—The babe with an "asthmatic" heredity is usually clear of symptoms at first. Mothers with hay fever sometimes describe their children as being "born sneezing," i.e. as having had hay fever from their day of birth in June; but usually they are free of this particular trouble for some years. The proteins which can act as foreign irritants to a baby are few if he is breast-fed, but still there are some air-borne particles, like the pollen above-mentioned, woolly garments which touch the skin, bacterial infections of the air-passage, and, above all, of the gut. Doubtless they will tend to cause

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symptoms at the various points of contact: rhinorrhœa, urticaria, and diarrhoea and vomiting respectively if the child is sensitive to any one of these, but if the foreign irritant gets absorbed into the blood-stream as will happen from gut sepsis in particular, then there will be broadcast in a susceptible child a tendency to some serous effusion of the asthma syndrome

Physiologically the baby is almost what his mother believes him to be—perfect; there is little or no damaged point at which the serous effusion may be precipitated. The part which stands the greatest chance of being first damaged by the outside world is the surface—the skin, and the first “asthmatic” symptoms to arrive are usually eczema or urticaria or a mixture of both. This occurs first of all generally on the scalp, perhaps we press our thesis too far in suggesting that this is always due to damage at birth, but I am told that when there has been very severe “crowning” at birth it is this area of the scalp of the child which tends to show the first symptoms of eczema. Certainly the delicate skin of the child is assaulted by a variety of irritants, such as new woolly clothes, soap, and the actinic rays of the sun.

This infantile eczema persists for a number of years, augmented possibly by one or more of the various foodstuffs which the child gradually adds to its dietary after weaning, and to which he becomes, or is, sensitive. The skin symptoms may be variegated by cyclic vomiting (food or sepsis) or possibly the gut wall is by this time damaged by repeated inflammation.

Asthma itself.—After such an infancy and early childhood the eczematous child must usually, in the course of nature, suffer some chest complaint, and—asthma begins. “The asthma started immediately after his whooping cough (or measles, or pneumonia, etc.), when he was seven years old, and he has had it off and on ever since; before that he had eczema only.” Some

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such history as this, if not invariable, is so commonly volunteered by parents that coincidence cannot be a sufficient explanation: the asthma symptoms have been precipitated by trauma, and they may continue either in place of the eczema, or in other cases may alternate with it, or with some cases be coincident with it. All through life damage to the lungs may precipitate asthma in protein-sensitive persons; a considerable percentage of men attending the asthma out-patient clinic at St. Mary's Hospital date their chest symptoms from being gassed in the war; they have usually a rather severe type of asthma which came on dramatically after being gassed and has persisted ever since.

Persons sensitive to the micro-organisms of air-passage infections will naturally respond at this point of direct contact, and will, therefore, tend to be worse in the winter months; but the trauma occasioned by these winter infections must almost certainly precipitate in the chest a good deal of wandering asthmatic tendency. It is chiefly for this reason—the trauma factor—that steady inoculation with minute doses of a mixed catarrhal vaccine is such a valuable stand-by in all unanalysable cases of asthma. One can on occasion, for example, clear up an unanalysed "locality asthma" (presumably due to mould spores) by treating the catarrhal conditions which have been acting as the precipitating trauma; in such a case the catarrhal condition could not have been the localizing protein.

Eczema—Returning to the skin manifestations, these may persist off and on throughout life or may develop late. Eczema notoriously chooses sites which are exposed to damage from wind, washing and sweating; it is attention to this trauma factor which forms the stock-in-trade of the old-fashioned dermatologist.

It is not always easy to distinguish between the trauma and sensitizing factors. Here is an instance of how one may jump to the wrong conclusion.

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concerning the protein irritant of eczema.—

A girl in a smart Bond Street flower-shop got an intolerable and unsightly eczema on her hands and wrists whenever these came in contact with the flowers, foliage, bast, etc., of her trade. Holidays quickly cured her, but a return to the shop promptly brought on a relapse. This, I am told, is a not infrequent occurrence on "delicate" skins, and all concerned in the case assumed that her work brought her hands into contact with some vegetable protein or proteins to which she was "asthmatically" sensitive. Extracts from a large collection of suspected flowers, leaves, dressings, etc., gave no dermal reaction, yet the girl had an authentic asthmatic history, so search was made elsewhere for some possible protein irritant. A bacterial overhaul showed her to be a very streptococcal person, and in particular she had a very heavy implant in the gut of a delicately growing streptococcus, and to an extract of this organism she gave a marked dermal reaction. Cautious doses of a suitable vaccine were followed by rapid improvement of the hands, and she can now work in the shop without the slightest difficulty. In spite of our first superficial analysis, if she were sensitive at all to the flowers of the shop this was only to a minor degree, they acted chiefly in providing local and non-specific damage, which gave the eczematic-tendency wandering in the blood the chance it was looking for from the point of view of protein sensitiveness, gut-sepsis was at fault and not the flower-shop.

Actinic Eczema.—The blend of urticaria and eczema which may come up persistently where light falls on the skin, and which may therefore be called actinic eczema, is clearly traumatic in localization. This localization is so exact that one may get as it were a negative printed from the neck opening and sleeve-end of a woman's dress, yet this and other forms of eczema may vanish dramatically when attention is paid to gut-sepsis, i.e. it is the protein irritants, plus the sensitive serum, plus the local injury (plus other things) which determines the trouble.

Urticaria—The urticaria tends to show itself, as with the artificial hay-fever urticaria above cited, in regions of the body where there has been injury or abrasion where the pommel rubs the thigh of a woman riding side-saddle, where the strap of a watch galls the wrist, most emphatically where the patient has begun to scratch or rub himself, and so forth.

Angio-neurotic Oedema.—An accentuated form of

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urticaria, angio-neurotic oedema, is curiously and capriciously localized, giving a very intense swelling of the skin and subcutaneous tissues. The lips and eyelids offer special facilities for oedematous exudation, and to a lesser degree also the throat and tongue; in waking hours these parts are always on the move, possibly setting free histamine-like substances which might augment a tendency to serous effusion, the tips of typists' fingers also suffer some mild form of trauma and have been known to show swellings

But putting these particular areas aside, the casual "lump coming up just anywhere" seems to arrive where there has been damage done. Patients notice this themselves; the lumps will come where the edge of the stiff old-fashioned corset rubs on the chest wall or thigh, where the braces cross the shoulder, where a jagged stump of a tooth presses into the buccal mucous membrane, where a "blackhead" has been expressed between two thumbnails, and so forth.

This last example occurred in a patient who had experienced these angio-neurotic swellings over a period of years, in this instance it began at and around the squeezed blackhead, gradually spread, and in thirty-six hours had involved the whole face, tongue and throat. It would seem impossible to avoid the conclusion that the violent squeezing of the skin precipitated these alarming, but happily transient symptoms

The localization of angio-neurotic oedema is so suitable for our present theme that perhaps an amusing example may be cited.—

A healthy young woman, who had previously had slight eczematic and urticarial attacks, but no angio-neurotic oedema, got engaged to a young man staying in the house, after announcing this to her people she escaped to her bedroom to receive the friendly chaff of her sisters, who noticed her lips beginning to swell and swell, till she was not only unsightly, but even unrecognizable. We may surmise that the vigorous osculatory encounters with which such contacts are appropriately concluded may have contributed the localizing trauma. The emotional disturbance inevitable to such an occasion no doubt also played a prominent part

Migraine.—In other toxic idiopathies, in other manifestations of the asthma syndrome, it is perhaps

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less easy to prove the trauma factor, but it is usually to be found. Migraine headaches which are asthmatic by inheritance or by marked coincidence with, or alternation with, some undoubted asthmatic manifestation (such as urticaria or asthma itself) may be "caused by" eye-strain from pronounced astigmatism and undue looking at cinema films, etc. The precipitation of the asthmatic symptoms in this cerebral form may notoriously be stopped by correcting or removing the trauma, i.e. the eye-strain. Such migraine is also frequently termed "liverish," because the protein irritant is so frequently derived from the gut

Epilepsy.—Cases of epilepsy may be found too frequently for coincidence in well-marked "asthmatic families," and it also alternates sometimes with other asthmatic symptoms, but in looking for examples of it in the family histories of patients (say, in hay-fever patients) the informant in about half the instances will say: "Oh, that doesn't count, for poor little Billy was dropped on his head," or "Uncle Henry had asthma all his life, but didn't have epilepsy till he fell down stairs on to his head" It dates from the trauma, in fact.

Paroxysmal Arthritis—Paroxysmal arthritis (which is much commoner in asthmatic circles than is suspected in the textbooks) frequently originates from a blow on the joint involved, usually the knee. Patients will naturally give this trauma as "the cause," though the asthmatic relationship can be traced by a competent investigation.

CONCLUSIONS.

Whenever the pathological mechanism of the asthma syndrome can be adequately examined, trauma will usually be found as the localizing factor, and in considering what treatment to employ it is always worth while to consider if this traumatic factor cannot be mitigated or removed.

How Should the Practitioner Diagnose and Treat Bronchial Asthma?

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RECENT researches have created an entirely new situation in the general opinion on asthma. Now that it can be asserted with precision that the different cases of bronchial asthma possess widely varying etiology, the practitioner has the task before him of deciding the appropriate etiology for every case presented to him. And, in point of fact, medical science of today is sufficiently far advanced to provide the practitioner with what he needs for this specific diagnosis.

It will be appropriate to give here a short sketch of the etiology of bronchial asthma as a confirmation of the opening remarks. We know today that there is a great similarity between an asthma attack and the anaphylactic reaction of the classical experiment on animals. Not only has this been confirmed by the symptoms, but also by the fact that it is very often possible to detect specific allergens in the vicinity of asthmatical patients, on the removal of which the illness disappears. The skin of the asthmatic patient shows symptoms of local hypersensitivity, similar to that of the Arthus phenomena, to the allergens which are at the moment under suspicion; it has also been possible in a large number of cases to transfer allergen passively (experiments by Praussnitz and Kustner). What is further in favour of the pathogenetic entity is the fact that in several forms of asthma, such as in the

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anaphylactic experiment, desensitization can be effected.

We must labour under no delusion that every one of the characteristics already mentioned will come into play with the same clearness and will be as capable of general application in the human being as they are in experiments on animals. This is undoubtedly caused by a series of conditions (as is often the case in the critical examination of an illness), which cannot in principle be studied with the clearness which is possible in the simple animal tests, where norms can be arbitrarily defined. There is also a connection with accidental influences, of whose importance in the breaking out of the asthmatical attack we are not yet in a position to take a clear general view—a position which we shall presumably attain in a few years. In the rational analysis of all clinical pictures the same process may always be observed; some primary and, in principle, important decisions are made and a portion left unexplained, some of this portion through further rationalization becomes clear; a part of it remains, however, in principle inexplicable, and which is bound up with the problem of the biological individual, it is on account of this that in each case individual judgment and treatment will remain necessary, no matter how logically the pathogenetic connections as a principle may be concluded.

If we grant that the admission of allergens really constitutes an important factor in the etiology of asthma, it must not be forgotten that the breaking out of the separate asthmatical attacks still depends very largely on certain conditions of absorption which vary at different times. Take the following case of an allergy of alimentation. The patient is hypersensitive to white of egg, he does not, however, suffer from an attack of asthma every time he partakes of this protein. This seems at first a matter difficult to view as a whole, and capricious. Why does the attack take place today, and why is it then for many days not

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repeated, although white of hen egg has been partaken of ? If one follows these cases with great care, one can prove that the allergic reaction appears only if peculiar conditions, which facilitate the absorption of the not entirely dissolved protein molecules, have the upper hand in the digestive tract—for example, an enteritis. This is a relatively simple case, but it conveys an important principle of which the practitioner must be continually cognizant, so that in every case he must pay special attention to these conditions of absorption. Stopping the absorption passages which have pathologically remained open often succeeds in hindering the whole complex of the illness. At the same time, in the case mentioned, the allergy continues to exist as before, and, with a change of conditions, under certain circumstances may suddenly again become manifest. Many cases whose manifestations were thought to be caused by psychic influences are in reality only to be attributed to changed absorption conditions, it must, however, be added that absorption following an alteration in strength of the flow of blood may be changed, and that the intensity of the flow depends largely on psychical influences, as we have seen in innumerable other cases.

Before the practitioner considers these means of absorption, it will be important for him to have some information about the etiology of asthma. Asthma, like all allergic illnesses, signifies reaction to an allergen. Some patients have a stronger tendency to this kind of reaction than others—one would like to say that the threshold of their sensibility is a lower one. Yet some of these patients, in whom and in whose families allergic symptoms have never appeared, may be forced into an allergic reaction if very active conditions for the absorption of allergen are created, and if a very strong concentration of the allergic material is chosen. This is clearly to be seen in the studies of Bloch and Karrer.

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on primula poison, which as a pure chemical substance causes a rash in nearly every human being. The percentage of persons who under present-day conditions of life show allergic reactions, varies between one per cent and ten per cent of the human race

As a rule, the hypersusceptibility begins specifically, i.e. it is at first dependent on one allergen, which perhaps by chance has come into contact with the patient under conditions in which it could easily be absorbed. Among children we have found a hypersusceptibility chiefly to eggs and milk, less often to flour. This is accounted for by the kind of food children live on, and is also without doubt because the act of feeding holds such a dominant place in child life, and further, because the possibility of the intrusion of injurious matter through other channels is very slight in the child world. When, in the case of a child, allergy of alimentation can be disproved, bad sleeping and living accommodation will usually be found to blame—this will have rendered an absorption through the breathing channels possible. Generally speaking, hypersusceptibility is shown to a particular stuffing material, frequently kapok (used in upholstery), or the spores of mould which, in damp and overcrowded homes, make themselves unpleasantly prominent.

When an allergy becomes manifest in an adult, it is usually impossible to prove in detail under what conditions it has developed, for the opportunity of coming into contact with all possible kinds of allergens differs according to the professional activity of the individual. If, however, we examine attentively the environment usually occupied by the adult, we will often find indications of the conditions of sensitization and of the later development of the attack. If, for instance, we find a man working in a barley refinery who suffers from eczema, conjunctivitis and asthmatical attacks, we immediately suspect that his illness has

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a connection with the work he performs, this suspicion will be confirmed if a positive cutaneous reaction to barley dust is also found, and if the symptoms disappear on the removal of the patient from this milieu. The asthma of the baker and miller is exactly similar to this, and usually shows a reaction to different kinds of flour. We are also aware through recent tests (Jadassohn) that hypersusceptibility to ascaris is not uncommon

I personally know of a series of cases in which asthma persisted as long as the patient was troubled by ascaris, and disappeared the moment they were removed. Apart from the eosinophil cells, there was a very strong cutaneous reaction to ascaris extract in all these cases. It may, however, happen that, in spite of removal of ascaris, the asthma remains, Jadassohn gives examples of this, and I personally know of several. In many of these cases it was possible to prove that the hypersusceptibility to ascaris was still strictly specific, and that the asthmatical symptoms remained manifest on account of other persons with ascaris being in the neighbourhood of the patient, or even his association, for example, with people who made scientific experiments with ascaris eggs was sufficient to cause heavy attacks of asthma. It is inconceivable how small a quantity of allergen is capable of causing an asthmatical or other kind of reaction. But cases of hypersusceptibility to constituents of plant or animal proteins (which may be wafted in the air to a great distance and then enter the body through the respiratory system) are far more frequent. The most classic example is the asthma of sufferers from hay-fever; this is caused by the absorption of a most minimal quantity of pollen, which is usually also strictly specific. We know, for instance, that among the hay-fever patients who take refuge from their illness in June and July on the island of

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Heligoland (on account of the absence of meadows there) symptoms break out; these are caused by pollen, wafted by the wind from the mainland, which is almost a hundred kilometres distant

I have mentioned this in order to show how often allergic reactions take place, even when the allergen is not in the vicinity of the patient. It may very easily happen that, through circumstances which we cannot anticipate, a breach in the patient's everyday world may be effected which causes an asthmatical attack.

From all this it will be understood that any practitioner who comes into contact with an allergic disease must make a painfully minute and careful examination of the history of the illness, and be prepared for the possibility of meeting with allergen. But, as has already been said, this examination leaves us sometimes still in a quandary. We are then left dependent on the discovery of objective changes in the patient, which may furnish a guide to the allergen. This procedure consists of a test of the hypersusceptibility of the skin to certain allergens—the so-called cutaneous reaction. It is nothing more nor less than the Arthus phenomenon, which in sensitized animals appears after a fortnight and is a local hyperergical inflammation of the skin in the circumscribed space which has been brought into contact with the sensitization body. There is no doubt that the cutaneous reaction was over-estimated in the first few years after its discovery. My recent experiences of it, however, have thoroughly convinced me that it should be used in every case, but always critically, and never without a thorough clinical study. The technique is very simple, but in order to carry it out a good deal of patience and self-sacrifice will be needed on the part of the practitioner. I shall describe only one form of cutaneous reaction—the intradermal injection of allergen extracts—because I consider this has given the most decisive results and

has proved its worth more than any other.

Into the skin of the back, which has previously been washed with ether, 0.05 ccm of the extracts should be injected in dilutions of different strengths. It is important to do at least two or three injections of dilutions (one part extract to nine parts water), because a certain degree of the quantitative hypersusceptibility can be ascertained from the reaction. At the present time the known allergens are very numerous (between fifty and a hundred), so that it would be too much to expect a test to be made of each one separately. A group of from five to ten closely related allergens should therefore be formed, and a test first made with the extracts of this group. If a positive reaction to one or more of these is found (distinct weals with the treated skin reddened and a negative control reaction with a solution of physiological saline), the groups may be split up and a second attempt made, it can then be judged which particular extract has been the most effective. The result of the reaction may be read off in from twenty minutes to an hour. The test is invariably carried out without any unpleasant symptoms, apart from the very slight pricks of the needle. At any rate, I have not seen, in thousands of tests, two which showed signs of a general reaction to which one part of substance to 10 of coca solution has been applied. I must, however, state that such reactions are described in the literature, these are generally cases in which a very powerful allergen is brought into contact with a particularly sensitive person, especially fish extracts, pollen extracts, and *ascaris* extract. In such cases, then, caution is needed. begin with a very weak dilution, say 1 in 100,000 of the original extract. The technique of reading off is not very easy and requires a certain practice, as a general standard for the interpretation of the strength of the reaction does not exist. Patients with a very strong general irritability

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of the skin often show an apparently positive reaction to non-specifically acting extracts, but their reaction to those specifically acting is generally much stronger.

After many years' experience I have found that it is always necessary to subject every case to a very painstaking *individual* clinical revision. Only thus can one safeguard against an over-evaluation of the cutaneous reaction on the one side, or of the anamnesis on the other. As I stated already, there is no doubt that the greatest difficulty in the carrying out of the examination is caused by the time it takes up, and also because a certain amount of practice is necessary, not only with regard to the judging of the cutaneous reaction as such, but also in evaluating the strength of the allergen extracts, which sometimes varies. Almost all observers have, up to the present, used their own extracts and have relied solely on these in treating a large number of patients. The extracts prepared in factories have not, on the whole, proved satisfactory, and have given widely varying verdicts to the different examiners who have had them in their hands. This may be caused by the possibility of the specificity of the allergen differing according to different countries and districts. Extensive examinations, however, which I carried out simultaneously with Berger in Innsbruck, of patients in Baden and the Rhein Pfalz, and also in the Tyrol, have, on the whole, corresponded in results, with the exception of some mould spores which were propagated in Heidelberg and proved ineffective in Innsbruck.

Another observation may prove to be a source of disappointment if an explanation of it is not given. By means of the cutaneous reaction patients are found to be polyvalent—hypersensitive to stuffs which have a different origin, for instance, to flour, cat's hair and mould spores. Contact with flour does not, however, lead to an allergic reaction, while contact with

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cat's hair and spores does. I take it that a latent hypersusceptibility to flour exists, but that the small quantity which is absorbed by breathing or in digestion is not sufficient to rise above the threshold of reaction. It may be accepted that patients who have an inclination to be hypersensitive to allergen do not confine themselves to one kind. The skin will give expression to this polyvalent hypersusceptibility, but a general hypersusceptibility reaction will not take place, because, as has already been mentioned, the threshold value for the latter has not been reached by the small quantity of the different allergens in the environment of the patient. It must, therefore, be accepted that side by side with the manifest allergy, another latent allergy to several other allergens exists.

A certain defect in the cutaneous reaction is that it is *a priori* improbable that every possible allergen shall be used in the test. On account of this, it is particularly necessary to obtain an exact history of the patient, and also to make an inspection of his environment, in order to make sure whether some rare allergen has not at one time played a part in the particular case.

As a practical suggestion, the following seems to me appropriate. In the different parts of the country central institutes should be set up to which the general practitioner, after having made a thorough analysis, could send his patients when certain suspicious signs of allergy became apparent, in order to have them tested by the cutaneous reaction. One to two days is quite sufficient for this. A great benefit to asthma research and to asthmatic patients would arise from the joint work of the general practitioner and the institutes of allergic research.

The therapeusis of asthma is not always so successful as the discussion of the principal points may seem to have allowed it to appear. The most favourable position is that of pollen asthma, the only rational

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treatment of which is the desensitization with small quantities of pollen extract introduced by Dr. John Freeman of London. After a specific diagnosis has been made, the desensitization can be carried out with the tried extracts which are on the market, produced by various well-known firms. In the other forms of asthma, desensitization has the best chance of result if a strictly monovalent hypersusceptibility exists. Whether the injection should be subcutaneous or intracutaneous is still a matter of contention. The latter method is specially recommended by certain French authorities (Valery-Radot and others). Storm van Leeuwen is very much in favour of non-specific treatment with tuberculin, and some other authorities follow him. It seems to me important that the patient should be removed from his allergic milieu during the specific desensitization, in order that indetectable simultaneous absorption of allergens by inhalation or food may be avoided. This has been carried out in the case of hay-fever desensitization, for during the period of treatment from March to May the pathogenetic allergen cannot be absorbed.

Though little doubt can be entertained that allergen is only one, although a decisive, factor in the creation of asthma, it would certainly be premature to seek in it the one pathogenetic factor. The different ways in which individuals react to allergens shows the importance of the constitutional factor. How far a decisive part is played by an inborn liability of the blood-vessels, how far inborn or acquired disturbances of the internal secretion are important, is not yet decided. That these and related influences play a part is seen by the fact that it is often possible to help an asthmatic patient by tonics, such as arsenic and iron. The danger of inducing the drug habit should always be borne in mind in the treatment of asthma.

Asthma: A Toxic Condition.

By JAMES ADAM, M A , MD

Honorary Surgeon for Diseases of the Ear, Nose and Throat, Glasgow Royal Infirmary

FOR the last thirty years I have been trying to show that asthma with all its vagaries is primarily a toxic condition. What is required of me here is to indicate whether later developments have led me to modify my views. Those views were based on clinical facts, and I may say forthwith that they have been confirmed by later developments as they had been by my own therapeutic results and by the results of others, both here and in America. What are those clinical facts ?

(1) *Periodicity*.—(a) Week-end periodicity is common in working folk, it occurs in about 60 per cent of them. This is connected with the overfeeding and under-exercise of the week-end. Food, especially carbohydrate, is burnt mainly in the muscles. With the week-end idleness, metabolism is less complete, there is imperfect nitrogenous metabolism, as indicated amongst other things by the frequent deposit of urates in the urine. This week-end periodicity is commoner than is usually realized, and has to be inquired for. It is not confined to asthma I have seen week-end epilepsy, albuminuria and angioneurotic œdema.

(b) Menstrual periodicity is connected with the metabolic disturbance of the period and occurs usually just before, but sometimes during or at the end of the flow. Obviously there is endocrine and vaso-motor disturbance. Hofbauer says that if there is

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dysmenorrhœa there is no asthma at the period.

(c) Nocturnal periodicity is the most common. Asthmatic attacks are common between 2 and 4 a.m., the time of the so-called "acid tide." Frequently the attacks occur on waking.

Obviously there is no room to drag in allergy in connection with these periodicities of asthma or of the other diseases mentioned.

(2) *The cure of these week-end cases by attention to the week-end error.*

(3) *The striking series of asthmatic cases cured by the war*—The strenuous life and not too generous feeding of the army cured many men who found asthma recur on their return to the softer conditions of civilized life, and who again became well by attention to diet and open-air exercise. I have had many such, but perhaps the most striking is Warren Crowe's case of the groom who used to get asthma on going near horses, but while in the army he could tackle horses with impunity. Army life removed his toxicosis as well as his allergy. Haseltine uses methods of general detoxication and so rids his patients of their toxicosis and their allergies at the same time.

(4) *The histories* of over 1,000 cases show that in 50 per cent, asthma begins before the end of the fifteenth year. There are several points to be noted here: (a) This is the period when infections, exanthemata, are most rife, modifying the metabolism of the individual. That this is not imaginary is confirmed by a series of cases of asthma occurring late in life immediately after such infections as scarlet fever and whooping cough. Pneumonia figures in the history of about 25 per cent of asthmatics (b) In early age habits are formed for a lifetime, nurture most modifies Nature and

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is apt to influence hereditary tendencies in a wrong direction, especially if the hygiene is bad. The case histories often reveal an absurd dietary. This is particularly well seen in the case of "the only child," sheltered from wind and rain, pampered with slops, "not strong," often off school. A sure way to keep up the attacks is to give the patient abundance of milk puddings and hot milk at bedtime. A Spartan régime will cure him, provided he is not a mouth-breather, and has no deformities. (c) 25 per cent. of these children have skin affections, mostly characterized by itching, and reckoned by many (e.g. Barber) as allergic. These affections correspond to catarrhal and spasmodic manifestations in lungs and larynx (recurrent bronchitis, bronchospasm, laryngitis, stridulosa, laryngismus), and I prefer to regard them simply as due to a general toxic state. As a matter of fact, they are cured largely by attention to diet and hygiene. It is to be noted that Barber, who emphasizes the importance of allergy, and Hofbauer, who minimizes it, do, like myself, stress diet, and insist that the treatment has no direct relation to specific allergens.

(5) *Sallow skin and cachectic appearance are common in chronic asthmatics.*—This indicates a toxic state, probably connected with adrenal defect and often disappearing together with improvement of the asthma after effective detoxication.

(6) *The vicious effect of mouth-breathing.*—Nigh 100 per cent. of asthmatic children under sixteen are curable if proper attention is paid to diet, bowels, open-air games and a weekly mercurial, provided they are not mouth-breathers and have no deformities. I can recall the cure of only two asthmatic mouth-breathers. One of them a boy who had been skin-tested, stuffed with food and vaccines, etc., at a well-known infirmary,

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without the slightest benefit. Hofbauer quite rightly stresses the importance of correct breathing, the vicious effect of mouth-breathing in producing inflammatory changes in bronchi and hilar glands, in diminishing the respiratory coefficient owing to a high-standing diaphragm, and thus interfering with the proper aeration of the blood. According to Hofbauer, mouth-breathing, habitual coughing, forced respiration, asthma aided by flatulence, big meals in the evening, are all conducive to causing an abnormally high position of the diaphragm so that the respiratory capacity of the thorax is reduced and neither by quicker breathing nor by deeper breathing is the same volume of air shifted per minute as normally. One of the main points in his treatment, from which he gets excellent results, is respiratory exercise so that the patient regains proper use of his diaphragm and substitutes "abdominal" for thoracic breathing. The patient keeps the mouth shut while inhaling and exhaling, does both movements evenly and hums during the latter. Obviously, if asthma is an acidosis efficient aeration is important, and although Hofbauer does not deal with the biochemistry of asthma, he mentions the mechanical factors will have chemical effects.

That these clinical facts are indicative of a general toxicosis is confirmed by biochemical findings which have become possible in recent years through the brilliant work of Folin. Seven years ago I found that there was deficient urea in the blood and urine of asthmatics, excess of ammonia in the urine, in addition to the common deposit of urates. This and the characteristic eosinophilia seemed to me to indicate that the toxæmia was in the direction of an acidosis, that in asthma the organism has a struggle to maintain its alkalinity. Last year Oriel carried this work further, and showed that there is excess of amino-acids in the blood. He also found that the chlorides are deficient in blood

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and urine. This, I suggest, is connected with the chloride shift, one of the methods—in addition to the conversion of urea into ammonia—whereby the blood maintains its alkalinity; and the eosinophilia is probably a manifestation of this chloride shift. At any rate the eosinophiles crowd the sputum when the asthmatic is having difficulty in getting rid of his CO₂.

Barber and Oriel think there is defect of liver function in allergy (including asthma), and regard the aminoacid excess as evidence thereof. Cantonnet regards hypercholesterolemia, which he finds the rule in asthma, and which I have also found common, as another sign of hepatic defect. Excess of diastase in the urine Dr. Alex. Glen has found to be common—I have also found it—and he puts this down to imperfect liver function.

To meet this defect Barber and Oriel give glucose, because they think that not only is it more easily metabolized than dextrose, but because the other functions of the liver, proteopexic, lipopexic, are aided by the glycogenic; and to meet the acidosis they adopt Nature's clue and give ammonia in the form of large doses of sal volatile, which is certainly helpful. Dr. Alex. Glen has found sodium bicarbonate useful in asthma during pregnancy, and I also in menstrual asthma, if given before the period.

It is interesting to note that both Barber, who stresses allergy, and Hofbauer, who does not, relate asthma to defects of the sympathetic rather than to vagotonia. Hofbauer calls this angiotonia (angiatonia seems a better word), and says that it is the basal factor in true asthma, and is often manifested by cold hands and feet. Cases like asthma, but without angiotonia, he calls asthmoid. Whether these authors relate this sympathetic defect to heredity I am not clear, but to me the toxicosis has probably as much to do with it.

No asthmatic case is properly handled without a nasal examination. Not all noses of asthmatics need

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treatment, but the bulk of them do. The most easily cured cases are those with polypi. The statement that surgical treatment is harmful has for sole basis bad surgery. It is not easy to prevent recurrence of polypi; but if the nasal walls are kept from contact without going too far in the way of emptying the nose, it can be done. Hofbauer will have nothing to do with reflex asthma; but Brodie and Dixon's experiments, the connection of the nuclei of the fifth and tenth nerves, the oculocardiac reflex based on the anatomical and functional nexus of those nerves (though it is found mainly where there is a high eosinophilia), are all against him. This is also my own experience. He is right, however, in emphasizing the evil effects of mouth-breathing. And all septic foci, whether in nose, mouth or abdomen, must be removed.

Asthma is on the increase because the complexity of our civilization with its indoor life is increasing, and has to be met accordingly. This necessitates concentration on the part of the patient, just as the sub-vitaminosis of a large part of the community needs concentration on a thing we had overlooked. The toxic state is good soil for allergens; it is usually worth while to pay more attention to the soil than to the seed. Dazzled by the brilliance of Richet's discovery, we have paid more attention to the allergens, just as after Pasteur's discovery we did to bacteria.

Asthma: A Vaso-Motor Neurosis.

By ALEXANDER FRANCIS, M.B., B.C.H.

THE chief reason why asthma is surrounded by so much mystery is that it is commonly looked upon as a substantive disease, for which it is hoped a definite cure can be found. Cures are continually being recorded by some special method of treatment, and it is thought the mystery is solved, until further experience shows the trouble to be as elusive as ever.

When Voltolini,¹ in 1872, published eleven cases of the relief of asthma by the removal of nasal polypi, he acutely revived the belief that asthma was due to nasal disease. Bosworth,² in 1889, stated that "a large majority of, if not all, cases of asthma are dependent upon some obstructive lesion in the nasal cavity" Brodie and Dixon's³ experiments, which sought to prove that asthma was due to spasm of the bronchial muscles, and that this spasm could be produced reflexly by stimulation of the nasal mucous membrane, added greatly to the belief in the nasal origin of asthma. Then followed general nasal cauterization and various nasal operations which, in many cases, did more harm than good to the asthmatic condition. Later, when vaccines arrived as the panacea for all ills, asthma was considered a microbic disease, and it was expected that the long-sought-for cure was to be found in an autogenous vaccine. This method of treatment was soon found to be of little avail.

The latest fashion is that asthma is due to hypersensitiveness to certain proteins. It is contended

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that, by carrying out innumerable skin tests, the offending protein can be discovered and that immunization against this "poison" will cure the asthma. From time to time other forms of treatment are advocated, such as the cures at Kissengen or Mont Dore, injections of peptone, compressed air; inhalations of oxygen, X-rays. There is no doubt that all the various methods of treatment have given relief in certain cases, but I contend that the whole point is missed by assuming that asthma is a disease, and not, as there is overwhelming evidence to show, merely a symptom of vaso-motor instability.

The real treatment of asthma consists in stabilizing the vaso-motor system. If we would adopt the slogan, "Stabilize the vaso-motor system," definite progress would be made in the treatment of asthma. Nasal treatment, desensitization, inhalations, massage, are all useful as a means to the end in view, but let us beware of missing the substance by grasping at the shadow.

I am convinced that in time to come the chief credit for solving the asthma problem will be given to the late Dr Francis Hare, in describing the mechanism of the paroxysmal neuroses, he shows that asthma is a symptom of vaso-dilation of the bronchial vessels and is analogous to megraine, vaso-motor rhinitis, etc. This vaso-dilation may be primary, due to want of vascular tone, as is seen in low blood-pressure cases; or secondary to vaso-constriction elsewhere, as is found in high blood-pressure cases. This theory is confirmed by the fact that we not uncommonly see cases in which asthma, headache, rhinitis and colitis alternate in the same patient, and by the fact that, on stabilizing the vaso-motor system, all these manifestations disappear.

The all-important question now arises: How is the vaso-motor system to be stabilized? That this is no easy matter can be appreciated when we realize how

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sensitive is the nervous mechanism which regulates the vaso-motor system. When in the best of health people may show signs of vascular instability, for example, by blushing on slight provocation; and asthma might justly be looked upon as "blushing" of the bronchial area. However, much can be done by removing, or protecting against, all possible sources of irritation, whether they come from organic lesions, proteins, foods or odours. Further, it is essential to improve the general tone of the system by attention to the bowels and getting rid of accumulated matter, by diet, properly regulated exercises, baths and massage. Incidentally, one of the most important rules is to rest before meals, and to take light walking exercise immediately after meals. On no account should a patient be allowed to sleep immediately after a meal, as this produces what Hare called "hyperpyrexia," a condition in which an excess of carbonaceous material, which has not been properly oxidized, is absorbed into the system.

In addition to the general treatment, there is a method of stabilization which is distinctly useful. On November 30, 1896, I incidentally touched with a galvano-cautery point the nasal septum of a young man who had been incapacitated by asthma for eight years previously. Since that day he has had no return of asthmatic trouble. At the time I considered the cessation of asthma merely a coincidence, but when I tried the treatment in other cases and, at first, met with unvarying success, I began to investigate the reaction. In 1902 I read a paper before the Clinical Society⁵ in which I explained the method of treatment and gave the results in 402 cases of asthma, of which 347 were completely or greatly relieved. Further, I stated that the prognosis was more hopeful the more normal the nose appeared; and the most difficult cases to deal with were those which had, or had had,

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nasal polypi. In 1903,⁶ being then under the belief that asthma was due to muscular spasm, I sought to explain that there was some connection between the nasal mucous membrane and the respiratory centre which controlled the bronchial muscles. It was only when Dr Francis Hare persuaded me to try this method of treatment in the better recognized vaso-motor neuroses, and I found that I could give relief in certain cases of headache, rhinitis, Raynaud's disease and colitis, that I realized that asthma was identical with the other neuroses in its causation. I then systematically took blood pressures before and after touching the nasal mucous membrane, and I found it was possible to affect profoundly the blood pressure and the vaso-motor system generally.

In 1910 I published⁷ the results of treatment of a further 1,066 cases of asthma, and attempted to explain the mechanism by which the vaso-motor system was affected by the nasal treatment. In *THE PRACTITIONER* of August, 1917,⁸ I pointed out that the nasal mucous membrane did not possess any special characteristics and had no monopoly of influence on the vaso-motor system, and that the stabilizing effect could be produced by treating the mucous membrane of other parts of the body. I make use of the nasal mucous membrane, as a rule, because it is the most accessible and easy to chart. It cannot too clearly be understood that in touching the mucous membrane of the nose one is not attempting to treat nasal lesions, or to remove hypersensitive spots which are supposed by some to be responsible for reflex spasm of the bronchial muscles. Sensitive spots can be found in almost any nose, and as there is a connection between the nasal and lachrymal nerves, it is easy to stimulate the lachrymal gland into action by irritating the nasal mucous membrane.

After treating many thousands of cases I am able to

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estimate fairly accurately the value and limitations, of this method of stabilizing the vaso-motor system. The two chief obstacles in the way of success are nasal polypi (whether they are present or have been removed) and a low systolic blood-pressure. The most hopeful signs are a normal nose and a good systolic pressure. The apparent nature of the asthma, its severity and the length of time it has persisted, have little bearing on the prognosis. With a normal nose and a good systolic pressure, at least 90 per cent. of cases do well; with nasal polypi and a low systolic pressure, not more than 10 per cent. can be benefited. The reason why children almost invariably do well is, I believe, because nasal polypi are uncommon in childhood.

That vaso-motor instability is the primary cause of asthma, and that hypersensitivity is only a secondary exciting factor, is indicated by several of my cases with pronounced cat asthma, in which patients after being sufficiently stabilized, without any special immunizing treatment, have been able to nurse a cat with impunity, and the case of a man who had severe asthma if he went near a horse, and yet who became able to hunt as soon as his vaso-motor system was made stable.

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Types of Asthma.

By FRANK COKE, F R C S

THE most pressing need in the interest of the individual patient and for the general advancement of the treatment of asthma, is to recognize that there are different types of asthma, due to different causes, revealed by symptoms peculiar to the particular type of case, and curable by lines of treatment expressly designed to defeat the specific cause or causes of the trouble. So many forms of treatment of asthma are of a non-specific nature that new variations are constantly appearing in medical journals. To my mind these lose half their value because no attempt is made to separate the cases into types before submitting them wholesale to the new treatment. If cases were correctly grouped into their respective types, how much more interesting and valuable would be such new forms of treatment as the exposure of the patient to X-rays.

Asthma is due to an obstruction to the respiration occurring in and about the bronchi and bronchioles. This may be caused by a contraction of the bronchial muscle, by inflammatory or urticarial swelling of the mucous membrane narrowing the calibre of the bronchioles, or by the partial occlusion of the lumen with asthmatical or bronchitic secretion. Different cases will exhibit these mechanical obstructions in different degrees, a single case changing from one to the other during a lifetime of asthma. Starting his career with acute attacks of dry, spasmodic asthma, the patient may be perfectly free in the intervals. But each attack will leave its mark on the mucous membrane. This will become thickened, irritable and slightly congested. Colds and minor attacks of bronchitis

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will add a microbic element until the congestion becomes a chronic inflammation. The severity of the paroxysms will lessen, while the bronchial factor will increase. At the end of a lifetime of asthma the emphysematous old gentleman, puffing and wheezing on the least exertion, will have a continual desire to expectorate, or at best will require an early morning bronchial toilet that would do credit to a navvy, until, thin and spare, he dies worn out with a failing heart.

The deformities of asthma are of three types. A strong inspiratory movement of the chest wall with an inability to meet the negative pressure, if I may be allowed to use such a term, necessitates the sucking in at the epigastrium, and wherever else the softness of the tissues allows of this, exactly as is seen in the obstruction to respiration by a diphtheritic laryngitis. Asthma occurring under the age of two will cause the costal cartilages to bend, pulling the sternum backwards, and leaving a large hollow in the front of the chest wall. Asthma from this age until the patient is fully grown causes the typical "pigeon chest." The lower ribs are sucked in at the sides and the sternum pouts forward. After full growth, with ossification and hardening of the ribs, much of the expansive pull is borne by the air alveoli in the lungs. These are stretched open, causing emphysema.

I am not able to arrange the various types of asthma into any orderly sequence, or to make them comply with any wider or more stereotyped classification as to cause, symptoms or response to treatment, but when great numbers of cases are seen, certain striking similarities between case and case allow one to recognize groups of cases which have each some outstanding feature in common. There is hardly any type that stands entirely alone and whose asthma is not subservient to such influences as affect other types. For

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instance, many patients only have asthma with a cold. Commonly these people are sensitive to feathers. On these occasions when the nose and throat are raw from a cold, the feathers protein obtains entrance to their bodies and gives them asthma. And again, such asthma as they have will undoubtedly be increased if, at the same time, the patient is overfed, under-exercised and constipated.

The greatest advance forward that has been made in recent years has been the recognition that asthma is frequently caused by some protein in the patient's food or environment to which he is sensitive. Further, the innocence or guilt of any suspected protein can be amply tested by the aid of the dermal reactions.

(1) *The Sensitive Type*—The most typical example of this class is the patient who has asthma during the hay-fever season. Without exception every patient who suffers from hay fever and hay asthma will always respond with a large urticarial wheal on any portion of the skin if the surface is scratched and the grass pollen applied to the abrasion. The reaction can be obtained at any time of the year. If the wheal fails to appear the patient does not suffer from hay fever. The following is such a pretty example of this that I print it again, although I have already made use of it in a former article:—

A child was brought to me to be treated for hay fever. The history was that as long as the child was playing on the sands she had no hay fever, but that she began to sneeze violently and to run at the eyes when she went into the fields and country behind the town. She gave no reaction to the grass pollens, therefore the case was not one of hay fever. She gave a large reaction to horse-hair, and going into the country meant driving in a small pony cart, the proximity to the pony and not to pollens being the cause of her troubles.

Every case of asthma, without exception, should be thoroughly tested with efficient proteins before any other treatment is commenced. In this way the cause of a patient's asthma may be discovered which was

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quite unsuspected, while additional proteins to those already known may be made evident

A patient came to me suffering from asthma. He had to leave his work, that of a furrier, because certain skins inevitably gave him asthma. He took other work but still continued to have asthma, perhaps to the extent of 10 per cent of his former trouble. When tested with the proteins he gave very large reactions to his former enemies, squirrel, hare and rabbit fur. In addition he reacted to feathers. Since replacing his feather bedding by kapoc his asthma has been reduced to practically nil.

Fifty to 60 per cent of all patients will give reactions to some protein or another, and possibly more would do so had we the correct proteins to test them with. A valuable addition to the series has been the discovery by Professor Storm van Leeuwen that patients may be sensitive to mould spores. I have found that some of the worst cases which I see give a large reaction to a specimen of *Aspergillus fumigatus*, which Professor Storm van Leeuwen kindly sent me.

A case may belong to several different types, and the ill-defined cases may pass into a collection of between-types. As the grouping of cases into types has not yet generally been adopted, I shall only describe such cases as are perfect examples of the various types as I see them. But it is perfectly useless to hope to advance further unless such statistics as refer to the age of onset, the history of heredity, and other main features are rigidly confined to the various types instead of to asthmatics as a whole.

The skin reactions are particularly useful in asthma because they do not appear to vary. If the patient suffers from asthma due to a particular protein, he will always give a reaction to that protein if applied to the skin. It was satisfactory to read in the recent report of an investigation into asthma at Edinburgh that positive dermal reactions had been obtained in 50 per cent. of this series of cases. This agrees very closely with the percentages obtained in America and by

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myself, percentages which were frankly disbelieved a few years ago.

After the discovery of all those proteins to which the patient is sensitive, the treatment is, by the method of avoidance, desensitization by minute doses of the offending protein, or by non-specific methods, peptone, the mixed coliform vaccine, tuberculin, auto-hæmotherapy and so forth

(2) *The Type with Enlarged Tonsils.*—This is common in children. The child will have a sharp attack of asthma at regular intervals of some fourteen days. The attack will last three or four days, possibly with some temperature, followed by a period of complete immunity. The attack occurs without regard to the weather or the locality to which the child may be moved. He takes his asthma with him, as it were. Removal of a pair of large tonsils may effect an immediate and permanent cure—on the other hand, my experience is that it is useless to attempt to cure any case of asthma in a child, irrespective of type, if that child has enlarged tonsils.

On all-fours with this type is the asthma caused by the presence of other septic foci, as in the antra, ethmoids, in an infected gall-bladder or an appendix, though the attacks and the intervals will not follow each other in such a remarkably regular sequence as they do with tonsillar cases.

(3) *The Week-end Type.*—Probably every case of asthma has two, three, or possibly more factors at work which, together, produce the attack. It is as though points were added up. When the total reaches a hundred the attack develops. A heavy meal late at night is always good for some thirty points, especially if it contains pastry or other rich foods. Where the ordinary man feels somnolent and inclined to doze, the asthmatic will become wheezy. If he takes the briefest of naps he will awake in an attack of asthma.

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for a certainty.

The "Week-end" type, first described by Dr. John Adam, refers more particularly to those examples seen in the working man. Midday Saturday work stops, and a surfeit, perhaps an orgy, of over-eating and over-drinking commences, unrelieved by any exercise. An attack of asthma will develop on Sunday night, and the man will be absent on Monday morning. Exactly comparable is the "Monday morning" disease in horses, too much food and no exercise. The patient may say, "It cannot be the food because I can eat what I like, when staying away." The food is responsible for some thirty points, the fact that the patient is free elsewhere means that he has left some forty or fifty points behind him, perhaps the cat or dog to which he is sensitive, and so can indulge himself with food without totalling altogether enough points to overstep the asthma line

Sunday is the day of salvation for many asthmatics. Instead of going to church, indulging in the mid-day roast and Yorkshire pudding, followed by a nap in the afternoon, the asthmatic must be out early, with a very modest packet of sandwiches, and walk some fifteen miles before returning home. Tennis, golf, the bicycle are all excellent forms of exercise, but it is essential that some measure of starvation goes with them. Many of my patients forgo all food for one day a week, and thereby keep free from asthma. For all asthmatics it is essential that they shall avoid rich and greasy foods, starches cooked with fat, cheese and nuts. Exercise must be taken each morning, preferably preceded by a chill bath. Choosing a soft rug or an india-rubber mat for the patient to stand on, he "marks time at the double" for a number of steps. As much vigour as the patient likes can be expended on this exercise. It can be done slowly or rapidly, bringing the knees well up, or as a mere shuffle. Even then the two main

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reasons for the exercise are obtained, to shake up the liver, and to give the heart regular, steady, every-morning exercise

(4) *The Aspirin-Sensitive Type*—This is perhaps the most striking of all, and no one who has seen many cases of asthma can have failed to recognize it. Almost without exception the patients are women. I remember seeing only one case in a male, a boy of seventeen. The majority of patients give no reaction to any proteins. They do not give a reaction to aspirin if applied directly to the skin, but they will to my blood if I have taken aspirins previously. They have the most appalling attacks of asthma, chiefly during the night, for which they inject themselves with adrenaline, preferably unmixed with other hormones. Many of these patients complain that a cough starts the attacks. A dry tickling feeling in the throat leads to coughing in violent paroxysms, followed immediately by a tightening of the bronchial muscle and very severe asthma. Should they by any mischance take aspirin unwittingly, as, perhaps, in a headache powder, an attack of asthma of such violence will follow, as to render them practically insensible for many hours. Next morning their chests may be so free from asthma that not a sound is to be heard, in spite of truly fearful nights.

Almost without exception these aspirin-sensitive people have polypi in their noses, and the converse is practically as big a certainty. Operations on the nose in these people should be limited to surgery of necessity, namely, the removal of polypi to clear the airways and the draining of the sinuses, particularly those of the ethmoid. Any optimism that a radical operation may cure the patient is doomed to the most complete disappointment. I have found the method of Dansyz—the autogenous mixed coliform vaccine and auto-haemotherapy—of most value out of a multitude of

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treatments, empirical and otherwise, that I have tried.

The only unalterable assertion that can be made about asthma is "that some do and some do not" Just as there is a type of asthmatic who is never troubled except after a cold, so there is a far rarer type which is never free except when suffering from a cold. Aspirin is poison to a few, but of the greatest help to many others

(5) *Types of Reflex Asthma.*—Many of the severer types of asthma are greatly assisted by cauterizing the nose, that is to say, the lower turbinals, the septum and the middle turbinals. I am in the habit of testing the mucous membrane in all cases with a probe covered with dry wool. By this method spots which are especially sensitive to the touch can be discovered, the patient may sneeze, the eye of that side may water, or, more important still, the patient may immediately cough. In other patients in whom a tickling cough initiates the attack of asthma, similarly sensitive spots may be found on the pharynx. Gastric, intestinal disturbances, the presence of worms, or even the stimulation of a purge may at times be responsible for an attack of asthma, as may septic processes in the abdomen.

(6) *The Type with Bronchitis*—Inflammation of the bronchi will cause asthma by the cough it produces, by the shortness of breath the bronchitis gives rise to, and by a reflex from the inflamed mucous membrane as by a draught of cold air, by the east wind, or by the inhalation of fogs and tobacco smoke. A common form of treatment is by an autogenous vaccine from the microbic inhabitants of the sputum. I have only found this very occasionally effective. It is very valuable when a patch of chronic bronchitis can be discovered in the chest, usually at one of the bases. An autogenous vaccine is of use when there is a

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continual bronchitic sputum each day altogether different from the clear, white-of-egg, come-and-go asthmatical sputum. In long-standing cases of asthma, a vaccine is of assistance in lessening the secondary bronchitis.

(7) *The Colloido-clasic Type*.—A very clear-cut type, though an ugly name to call it by. The patients are practically always women between the age of twenty and fifty. Without exception they are plump, sometimes even stout. They have beautiful skins, they bruise easily, and are mostly excessive sneezers. There is not uncommonly a history of the receipt of an injection of anti-diphtheritic serum. They may have urticaria, or various portions of the body may swell at times without much irritation.

(8) *The Menstrual Type*.—Attacks of asthma, sneezing, and urticaria are often very greatly aggravated by the approach of the menstrual period, so much so in some cases that the attacks appear to be due to this event alone. On the other hand, during pregnancy many asthmatics become entirely free from all attacks.

(9) *The Periodic Type*.—A rare, but clearly defined type in which the patient, after a month's freedom from asthma, gradually becomes wheezy and asthmatical, until he reaches a condition when he can no longer work and must retire to bed. After a few weeks of very severe asthma, the storm abates somewhat and dies away, giving the patient another month's freedom for recuperation before the same sequence happens over again. The whole cycle will take three or four months to run its course.

(10) *Other Types*.—There are many other groups of cases in which some symptom may be so predominant as to constitute a type, as those with high blood-pressures, those with eczema, seasonal types and climatic types.

The Treatment of Asthma in the Adult.

By J ANDRÉ, M.D.

Mont Dore, France

IN THE PRACTITIONER of August 1928, I stated that, in my opinion, in practically all cases, asthma is caused by a diathesis analogous with the colloidal diathesis of Widal; this I defined as the state created by toxæmia of all kinds, autogenous and exogenous, alimentary or infective, protein or mineral; this state can only occur in association with the condition, on which the appearance of the attack depends. Accepting this conclusion, which appears to me clear and logical, it is possible to deduce an efficacious treatment which will vary according to the dominating symptoms of the disease.

In considering the treatment of the fundamental causes, of the diathesis, and of the attack itself, it will be observed, moreover, that only the first one is a curative treatment, and that its success will suppress all external evidence of the malady. Treatment of the attack is a temporary palliative only.

The treatment of the fundamental causes has been attempted in very different ways. Different schools of thought have successively attempted to subdue a certain element which at one time was considered to be of the first importance, thinking that when this was done a cure would follow. Recently, the causes most frequently considered as responsible for asthma have been the sensitization anaphylaxis of Richet and the colloidal diathesis of Widal.

As the body is sensitized to a substance, it appeared logical to try to desensitize it, first of all by the sub-

stance incriminated, then, afterwards, to desensitize it in a more general way. The principle is based on this observation, that when we introduce into a sensitized organism progressively increasing doses of the sensitizing substance, the subject finally ceases to react to it—it is desensitized.

The digestive method (specific skeptophylaxy with progressive doses of Besredka) may avert some attacks. The cutaneous method, or method of skin reactions, is rather impracticable, but it has considerable theoretical interest. The principle is the same in the subcutaneous method, and varies according to the circumstances, pollen, animal proteins or medicinal substances, and in injections auto- or hetero-multi-valent vaccines of varying composition are used.

True anaphylaxis cannot be regarded as proved. In order to avoid the occurrence of colloidal shock, peptone therapy by the digestive method, intradermal or venous has been employed. The peptone of milk, the blood or serum of the patient, or of other persons or animals have been and are still used. Certain authorities even use crystalloids and calomel, and the hypo-sulphate and carbonate of soda have been prescribed by Spillmann, Lumière, Girard and others. This pathogenic and almost symptomatic treatment necessitates wide experience and great care. Certain proceedings, in particular intravenous injections, may cause serious accidents, while the majority of the others are capable of giving rise to unpleasant symptoms, and these disadvantages are not compensated by conclusive results. The desensitization does not always appear. When it appears, it is often incomplete and transient; relapses are frequent and occur at short intervals. These methods are only adjuncts to the treatment, and should not constitute the basis of it.

With the ground thus cleared, we may now describe a method of treatment for asthma which, while it

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attacks the source first and above all, will utilize, even apart from the attacks, all the detailed methods capable of bringing about the desired result—the modification of the diathesis, the chief cause of asthma. This treatment attacks simultaneously the various elements defined as constituting this diathesis; it is necessary to detoxicate, then to destroy the aptitude of the organism for a fresh toxin. The detoxication of an individual is obtained (a) by dieting and hygiene, and (b) by the use of suitable drugs.

(a) Dieting plays a most important part, which is insufficiently recognized at the present time, it has one main purpose, namely, to avoid all causes of direct or indirect toxication. The diets are many which we advise in asthma, we cannot describe them here. all stimulating foods or those rich in purin must be strictly banned. The chloride-free diet gives very good results in serious cases. Hygiene has an analogous aim, but it allows also a complete use of the food ingested, and a more complete evacuation of the waste products. Moderate open-air exercises, a healthy district, and above all hydrotherapy in the form of a Scotch douche should be advised. Moral hygiene is important—the asthmatic should be free from worry. Treatment by climate is also desirable, an average altitude of 1,000 to 1,200 metres (3,250 to 4,000 feet) is advisable.

(b) Toxæmia can, however, be combated by certain drugs. Iodine and its compounds is, in my opinion, the standard treatment for asthma, and is perfectly rational on account of its recognized results. Iodine facilitates, in fact, the disintegration of the proteins and consequently acts powerfully on the general metabolism, the elimination of the toxic waste products is thus increased. Moreover, the thyroid secretion is augmented, which also assists metabolism, and the blood coagubility is modified in a way unfavourable to the production of "colloidal shock." It increases

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phagocytosis, and finally acts selectively on the respiratory system, favours haematoses, diminishes venous stasis and increases bronchial secretion.

Numerous iodine compounds are used per os, but they are more frequently administered in the form of iodide of potassium in doses of two to five grains a day, as a draught or as a syrup, alone or combined with codeine or caffeine. Sometimes iodide of potassium and arsenic are prescribed in succession. Organic compounds of iodine may also be prescribed, sometimes the subcutaneous method may be used. The effect is unquestionable in asthma, but only part of the pathogenic factors are effected by this method, namely, the toxic factor and the bronchial secretions. The whole of the nervous aspect of the complaint remains to be treated. Moreover, it is necessary to avoid giving too large a dose and prolonging the treatment in order to avert the phenomena of iodine poisoning. The salts of soda which act as purgatives, colchicum, atophan, piperazine, and the salts of lithia, are also used to overcome the organic intoxication. Their action, although of value, is of secondary importance.

Such are the methods which enable us to deal effectively with the toxæmia, the etiological cause of asthma. Sometimes this toxæmia has not yet established a persistent vitiation of the nervous system, and its suppression is alone sufficient to obtain a definite cure. But more often the neurotic has formed such a habit that the intoxication increases with very great facility, and this nervous state must be modified in order to obtain a cure. We shall now review the methods used to modify this nervous diathesis.

First of all, let us recall the extremely close relations between the endocrine glands and the holosympathetic which has been demonstrated by recent investigations. As the discrimination of the part played by each group is not yet definite, I shall discuss

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together the treatment of the functional attacks of both these systems. We do not possess, it is true, any remedy which allows us to modify the vegetative tone in a permanent way by direct action on this system.

The method of acting on the endocrine system is capable of giving more convincing results and allows of a secondary action on the nervous system; it is possible to act on the endocrines either by causing extracts of similar glands to be absorbed, which are obtained by the use of the glands of animals, or by acting directly on the organ by X-rays or ultra-violet rays, or by administering drugs with a specific action. Ootherapy has established a certain reputation, it has a marked action, which can be regulated. It is substitutive, or capable of replacing, when it is necessary to reinvest an organ that is totally failing; it has an excitatory action when it is necessary to stimulate an organ that is partially failing; it has a regulatory action when it is necessary to calm an organ which is capricious and generally too active. The doses vary between 5 and 20 centigrams ($\frac{1}{2}$ to 3 grains), taken either in cachets or capsules, two or three times a day. We are concerned chiefly with the thyroid and the ovaries; each of these organs has a direct action on the para-sympathetic which controls the appearance of the "colloidal clasic shock," and consequently of the attack. The regulation of these secretions is, therefore, of the highest therapeutical interest.

Radio-therapy and ultra-violet rays are different means of arriving at the same result, namely, by exciting a weak gland or calming a hyperactive gland. The results, although often excellent, are somewhat uncertain. These treatments are particularly efficacious in the case of thyroid asthma. Calcium, in doses of 5 c cm of a 10 per cent solution intravenously, or 20 grams—5 drachms—by the mouth often brings about an improvement, and I use it frequently.

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Such are the different methods which, after first having treated the patient by definite dieting and hygiene, and having overcome the dominating features of each case, bring about considerable and lasting improvement, and sometimes cure.

There is, however, a treatment which embodies them all, and which has a manifest advantage over all that have already been studied. It is not an artifice of man's invention, but a treatment that is natural and experimental, though perfectly rational—I refer to *crenotherapy*. Natural mineral water or, in Robin's words, "living lymph," although its chemical constitution may not explain its effects, has a curative influence. Since the conquest of the Gauls by Rome, Mont-Dore has cured affections of the respiratory system. Its alkaline waters, which are radio-active, warm, contain arsenic and all the principles which we have found to be beneficial in asthma (having a particular action on the organo-vegetative system and on the bronchial secretions). A sufficiently prolonged use of them (three years at least) if taken from 20 to 25 days every year to year, may bring about a cure in all the varieties of asthma. To the results of taking the waters, the effect of altitude (1,050 metres—3,000 feet) of climate and of hygiene must be added, which all unite to bring about the cure. This is a valuable aid, which should not be neglected in the treatment of the disease with which we are dealing.

The manifestations of asthma may be divided into moderate and violent attacks, and their treatment must differ. In slight attacks, we often use the fumes of powder of *solanaceæ*, belladonna, *hyoscyamus*, *datura stramonium*, either in the form of inhalations or as cigarettes or cigars. The vapours of ether, chloroform, amyl nitrite, ethyl iodide or pyridine may stop a slight attack. Antispasmodics, such as *quebracho*, *spurge*, *plufera*, *grindelia robusta*, benzoate of benzyl, sodium

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nitrite, antipyrin, aspirin, quinine salts, and different compounds with a caffeine base, give, through the digestive system, results when there are oppressive crises, without intense asphyxia. The action of these drugs is completed in addition by encouraging the secretions with basalmics, such as kermes, polygala, terpin, ipecacuanha

The violent attacks, which are much more difficult to treat, are relieved by three standard medicines opium and its derivatives, belladonna and adrenaline, to which we must add a new and remarkable compound, namely, ephedrine.

Since 1910, until recent years, adrenaline has been the chief remedy in the violent attacks of asthma. Exciting the sympathetic, it destroys the predominance of the vagus by restoring its equilibrium, combating shock and acting as a vaso-constrictor. But its action is of short duration—two to three hours usually, on the other hand, it is certain to act in 95 per cent. of cases. Adrenaline becomes changed in composition in the digestive system and this is one of its serious disadvantages, the comparatively large doses that must be used constitute its second great disadvantage. It is administered also by hypodermic or intramuscular injection, beginning with half a milligram, we may use as much as a milligram, but that amount should never be exceeded. It is associated with the total extract of the hypophysis.

Ephedrine, introduced in 1923, gives quite as satisfactory results as those of adrenaline, but possesses two enormous advantages—it can be administered by the mouth and, moreover, its action lasts longer—from six to eight hours. It is given in compressed form in daily doses of 5 to 15 centigrams. During an attack it may be possible to ward off the paroxysm by a general sedative, such as chloral, valeriate of ammonia, the bromides, cannabis indica.

The Nature and Treatment of Asthma.

By J E R McDONAGH, F.R.C.S

ASTHMA and hay-fever are mild forms of shock affecting the respiratory system, and the nature of these manifestations of disease does not differ from shock occurring elsewhere in the body. Shock is dependent upon two factors (1) A precipitation of colloid protein particles in the vessels of the organ involved, (2) a loss to the organ of oxygenated blood. These factors working in the brain give rise to migraine, epilepsy, eclampsia, heat-stroke, so-called insulin-hyperglycæmia and coma In the skin to angio-neurotic œdema, urticaria and *Erythema multiforme* In the systemic circulation, to *Status lymphaticus*, tetany and spasmophilia, and when they occur in the portal circulation, to vomiting and diarrhoea and to changes affecting the parenchyma of the liver and kidneys

Current View of Nature of Asthma—Asthma is considered to be caused by a constriction of the bronchioles consequent upon a stimulation of the unstriped peri-bronchial muscular tissue As this muscular tissue is supplied by the vagus, asthma is regarded as being one of the symptoms of vagotonia, a condition brought into evidence most frequently by hypersensitiveness Therefore, treatment is aimed at removing the cause of the hypersensitiveness and at stimulating the sympathetic nervous system with adrenaline or of paralysing the vagus with atropine

The Nature of Pulmonary Shock.—In the most severe form of pulmonary shock characterized by expiratory dyspnoea, the bronchioles are not constricted, although the lungs are collapsed and bloodless The main

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feature is the dilatation of the peri-arterial lymphatic spaces occasioned by the precipitation therein of the protein particles in the plasma, which have become too large or too agglutinated to circulate (hydration). Such a severe degree of hydration is occasioned experimentally most readily by substances bearing a powerful positive electric charge, such as histamine, nicotine, arecoline, conine, insulin, and unprotected colloid and metallic hydroxides. The severer form of protein hydration renders an organ bloodless and leads to a hyperactivity of its cellular elements. Should the lung be the organ involved, one of the results of the hyperactivity is a relaxation of the peri-bronchial muscular tissue—paralysis of the vagus.

When the hydration is less severe, the precipitation takes place in the veins or in the lungs in the terminal branches of the pulmonary arteries, and the vessels contain corpuscular elements as well. The precipitated protein particles cause a hyperactivity of the cellular elements of the organ, an action which is enhanced by the stagnation of the unoxygenated red blood-corpuscles. The hyperactivity of the cells of the alveoli leads to a rapid interchange of gases, of the cells of the bronchioles to an excessive production of mucus, and of the unstriped muscular tissue to a constriction of the bronchioles. Owing to the blood not being oxygenated, the first results in difficulties of breathing. The second adds still further to the respiratory embarrassment because the bronchioles become plugged with mucus. The mucus becomes mixed with eosinophile leucocytes, whose so-called "granules" are destined to cause dispersion of the hydrated protein particles. The constriction of the bronchioles is never as great as that which occurs in broncho-pneumonia, and the phenomenon does not play the rôle in asthma generally assigned to it. The expiratory dyspnoea is due, not

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to the constriction of the bronchioles, but to the blood not being oxygenated.

Although inspiratory dyspnoea characterizes inflammatory conditions of the lungs, there is not such an enormous difference between the two forms of dyspnoea as to warrant the distinction always made between asthma and the various forms of pneumonitis. As a matter of fact, asthma and pneumonitis are associated, because the one may develop into the other and vice versa. In children particularly it may be almost impossible to differentiate between asthma and broncho-pneumonia. This is because protein particles subjected to an abnormal chemico-physical change undergo a cyclical change in course of time, and the cyclical changes of hydration are liable to result in what is known as "inflammation." Hydrated protein particles tend in the course of time to break up into more numerous and smaller particles. If the smaller particles are fully negatively charged, the normal state of dispersion is reached, and this forms the basis of the symptomatic treatment of asthma. Should the particles have been deprived of electrons they tend to pass into true solution (dehydration), and fever, etc., arise. But so long as there is an enormous numerical increase the particles (dispersed phase) may change places with the liquid portion of the plasma (dispersion medium), as occurs when gelatine in a hot "solution" cools to form a jelly. Gelatine of the protein particles results in thrombosis, and dehydration in inflammation.

The Cause of Hydration of the Protein Particles in the Plasma.—Hydration of the protein particles in the plasma is hereditary, and this renders asthma and hay-fever merely manifestations of inherited disease. The main result of inherited disease is malcoordination, which for the sake of description is divided into mental

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and physical. Mental malcoordination results in vagotonia, and physical malcoordination in misuse of the body as a whole. Vagotonia causes trouble in the colon, and misuse of the body interferes with the proper functioning of the intra-thoracic viscera.

Familial chronic intestinal intoxication is the main precipitant of the manifestations of inherited disease because it is being continually aggravated by faulty dietary and inadequate elimination. A faulty dietary changes the non-pathogenic *Bacillus coli communis* into pathogenic mutation forms, which are mostly non-lactose fermenters. The abnormal bacilli break down food into bodies which reach the blood-stream to cause or to augment an already existing hydration. There may be other precipitants, but these are always secondary to a familial chronic intestinal intoxication, hence explaining why removing secondary foci of intoxication, such as dental, nasal, tonsillar and urogenital sepsis, never more than ameliorates the clinical manifestation presented. Hypersensitiveness means no more than augmented hydration, and removing the agent causing the same does not get rid of the factor which set the original hydration in motion. It is for this reason that skin tests are valueless, based as they are on entirely false premises.

The Treatment of Asthma—To rid humanity of the manifestations of inherited disease it would be necessary to select one's great-grandparents. Failing this, the best must be done to prevent children being born malcoordinated. Once malcoordination is there, it should be corrected on lines laid down by Alexander in his "Constructive Conscious Control of the Individual." A chronic intestinal intoxication can be benefited by a proper dietary, adequate elimination, colonic lavage and immunization against the pathogenic micro-organism found in the excreta. The

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hydrated protein particles are dispersed best by conductors when the hydration is acute, by condensers when the hydration is chronic, and by drugs which combine a conductor with a condenser action when the hydration is subacute. The best conductors are Sup 36 and B.N. 368, the best condensers are contramine, iodine, thyroxin and oxygen, the last when injected subcutaneously, and the drugs exhibiting the combined action are acetyl-choline, choline, Sup 468, para-thor-mone, colloid calcium oleate, and strontium aspartate. Adrenaline, ephedrine and ephetonine have, in my opinion, no advantages the drugs mentioned possess. Adrenaline merely acts by causing dispersion of the hydrated protein particles, not by relaxing the bronchial muscles or by stimulating the sympathetic nervous system. Atropine is worse than useless, because it exhibits an initial hydrator effect which may be sufficient to so add to an already existing hydration as to convert an attack of hay-fever into one of asthma, and so on. Atropine may cause sufficient hydration as to lead to hyperactivity, but this result is not due to any action it has upon the vagus.

Practical Notes.

The Relation to Asthma of the Vagal Innervation to the Bronchi.

F H T R Mount has carried out physiological and histological observations on dogs, guinea-pigs and a monkey with regard to the symptoms and changes produced by various types of stimulation of the vagi in the neck. In many cases the resultant changes in the lungs, bronchial constriction, bronchorrhœa, cellular infiltration and emphysema were similar to that seen in asthma. The studies thus establish a physiological basis for the reflex nature of certain types of asthma. It was found that no untoward symptoms followed the section in the dog of the fibres involved. The author suggests that in certain types of intractable asthma posterior mediastinotomy, with sections of the bronchial branches of the vagi using the extra-pleural approach, might be considered—(*American Journal of the Medical Sciences*, May, 1929, p 697)

Cardiac Asthma.

R S Palmer and P D White state that cardiac asthma is a paroxysmal acute dyspnoea which is usually nocturnal but sometimes follows exertion. It may last for a few minutes only or for hours, and is accompanied by a sense of suffocation and wheezing, and often by cough with frothy and blood-stained sputum, the more severe type being termed acute suffocative pulmonary oedema. The authors are of opinion that cardiac asthma is due to left ventricular strain and failure, causing a stasis in the pulmonary circulation, the right ventricle supplying more blood than the left ventricle can deal with. This pulmonary circulatory stasis increases until by reflex stimulation the attack of asthma is induced and the patient wakes up. On sitting up, the stasis and strain on the left ventricle are reduced and recovery follows. The administration of morphia assists by reducing the irritability of the respiratory and other nerve centres—(*Journal of the American Medical Association*, February 9, 1929, p 431)

Basal Metabolism in Asthma.

V Cordier found in 42 patients suffering from asthma and in whom an endocrine origin of asthma was suspected, that there were three with hypothyroidism, 18 with hyperthyroidism, and 21 with dysthyroidism, and the stages of hyperthyroidism and hypothyroidism alternating irregularly in the last group. It seemed important, therefore, from the point of view of treatment, to determine the basal metabolic rate in asthmatic patients—(*Journal de Médecine de Lyon*, March 5, 1929, p. 151)

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Hay Fever and Asthma caused by Mulberry Pollen

H S Bernton describes three cases of allergy which could be ascribed to a type of mulberry called the paper mulberry. Treatment was carried out with extracts of mulberry pollen after the particular genus of mulberry had been defined. In the diagnostic test it was found that dermal sensitiveness of the nasal mucosa to pollen did not appear in every case in parallel instances. It would appear from Dr Bernton's observations that the subcutaneous reaction to pollen albumen is a more critical index of the sensitiveness of the mucosa —(*Journal of Laboratory and Clinical Medicine*, 1928, vol 13, no 9, p 829)

The Relation of Bronchial Asthma to Malaria.

Vladimir Wejtko describes the results of observation made on bronchial asthma in various parts of Russia and comes to the conclusion that this condition is the result of a latent malarial infection, in which treatment with quinine is indicated —(*Wiener Medizinische Wochenschrift*, August 25, 1928, p 1113)

Modern Methods in the Diagnosis and Treatment of Allergic Diseases.

E Fränkel and E Levy point out that from our knowledge of the relationship between so-called allergic diseases and other sensibility of albumen, certain guiding lines of treatment can be established, namely, removal of the allergen, specific desensitizing and final interruption of the shock circle giving rise to the disease. Levy discusses the possibility of determining the condition which releases the attack. If the noxious material is contained in the air, the patient must breathe in air free from allergen, this process being carried out either in an isolated cubicle or through a mask. The respiration of such free air for several hours in itself produces an alleviation of the condition —(*Medizinische Klinik*, February 22, 1929, p 294)

An Investigation of Plants which cause Hay Fever.

C E Benjamins, J Idzeda and J H Neinhuis describe their method of rendering a definite area of the skin insensitive to a certain pollen extract by repeated injections of this extract in increasing strengths. When extracts of other types of pollen were injected into the same area it was shown that the skin became again sensitive to the secondary pollens. From this observation they draw the conclusion that there is a difference between individual pollens, consisting in a specific action and not merely in quantitative action —(*Nederlandsche Tijdschrift voor Geneeskunde*, January 12, 1929, p 143)

Bronchial Asthma in Infancy.

K Stolte describes five typical cases of asthma occurring in earliest infancy. Of the five cases two proved fatal, the disease being

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more dangerous in infants than in adults. This rare and serious condition in such young subjects was treated with narcotics, urethane, calcium preparations intramuscularly, with cardiac tonics and small doses of luminal—(*Jahrbuch für Kinderheilkunde*, November, 1928, p 1)

Ephedrine and Trypsin in Asthma.

A H W. Caulfeild states that ephedrine dissolved in gomenol (oleum cajuputi), and trypsin have proved of definite benefit in a sufficient number of selected cases of allergic conditions to warrant publication, with a view of thus providing a more extended trial. Two features have been very noticeable in the cases where bronchial instillation of ephedrine in gomenol has been tried. The favourable effect on the asthma, presumably due to the ephedrine, has been prolonged from about two to six days, which is in marked contrast to the duration of the relief afforded by the ingestion of ephedrine. Secondly, no instance has been encountered of idiosyncrasy to ephedrine. The method adopted has been to instil into the trachea about 2 c cm of ephedrine (1 to 1.5 per cent), in gomenol (10 to 25 per cent) by the supraglottic method by means of a Yankhauer laryngeal syringe. In only two cases out of seventeen did no benefit result. The method of administering trypsin has been to give 90 grains daily (in three doses of 30 grains each) for ten days, followed by an intermission, this has given marked relief in a number of cases—(*Canadian Medical Association Journal*, May, 1929, p 498)

The Psychic Factor in Bronchial Asthma.

Erwin Moos is of opinion that, from his own experience of several hundred cases, the psychic factor in the causation of bronchial asthma has never been sufficiently clearly recognized nor has received adequate consideration. He follows other authors in believing that the psyche plays the chief part in determining the attacks and the whole course of the affection. He therefore advises treatment by psycho-analysis, conducted for at least an hour weekly over a period of six to eight weeks, and in his hands this measure brought a large number of severely affected asthmatics back to normal. In most cases a complete cure was effected, the bronchitic and pulmonary symptoms were no longer demonstrable at the end of the course of treatment, the sputum was lessened and even after the first analysis he noted that Charcot-Leyden crystals and Curschmann's spirals had disappeared where they had previously been present. The usual drug treatment, and particularly narcotics, were reduced to a minimum, until the patients had sufficient confidence to do without them altogether. At the commencement of treatment Dr Moos found it was seldom possible to cut short an asthmatic attack by hypnosis, but as treatment progressed suggestion became increasingly effective—(*Münchener Medizinische Wochenschrift*, October 26, 1928 p 1841)

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ALLOTT, H C W, L A H Dub, L R C S Ed, appointed Certifying Factory Surgeon for the Walsall District (Warwickshire)

BELL, W, M D, appointed Medical Referee under the Workmen's Compensation Act for the Districts of the Bradford, Keighley, Skipton and Settle County Courts, vice Dr W Wrangham deceased

BICLENKY, D, L R C P Lond, M R C S, appointed Resident House Physician Westminster Hospital

BROWN, R CHRISTIE, M S Durh, F R C S, appointed Assistant Obstetric Surgeon to the City of London Maternity Hospital

CARLING, E R, M B, B S Lond, F R C S Eng, appointed to the Consulting Staff, King Edward VII's Convalescent Home for Officers at Osborne, I O W

CHOYCE, C C, M D, Ch B Edin, F R C B Eng, appointed to the Consulting Staff, King Edward VII's Convalescent Home for Officers at Osborne, I O W

DAVIES, J LLEWELLYN, M B, Ch B Camb, F R C S, appointed Consulting Urological Surgeon, Mansfield and District Hospital

DOWNER, HAROLD, M B, Ch B, D L O, has been appointed Honorary Rhinologist to the Sussex Eye Hospital

DURIE, DORIS L, L R C P Lond, M R C S, D P H, has been appointed Assistant Medical Officer of Health, Southend

FLETCHER, H MORLEY, M D Camb, F R C P Lond, appointed to the Consulting Staff, King Edward VII's Convalescent Home for Officers at Osborne, I O W

FULLER, F HOLCOMBE, M R C S Eng, L R C P Lond, L D S R C S Eng, appointed Honorary Surgeon to the Sussex Eye Hospital, Brighton

GASK, G E, F R C S Eng, appointed to the Consulting Staff, King Edward VII's Convalescent Home for Officers at Osborne, I O W

HORNE, H F, M D, B Chir Camb, appointed Medical Referee under the Workmen's Compensation Act for Barnsley County Court

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BROADFOOT, J., M D., Ch B Glasg., appointed Medical Officer of Health, Inverness

CLEMENTS, A E., L R C P. and L R C S I., appointed Medical Officer of Health, Irvenstown District, Fermanagh

DAVIES, HUBERT S., M R C S., L R C P., appointed Resident Anæsthetist, Queen Charlotte's Maternity Hospital, Marylebone Road, N W 1

DIXON, JAMES H., M D., M S., appointed Medical Referee under the Workmen's Compensation Act for the Marylebone County Court.

GARLAND, HUGH G., M D Leeds, M R C P., appointed Resident Medical Officer, Leeds General Infirmary

GORDON, JOHN A., M B., Ch B Aberd., appointed O P Medical Officer to the National Hospital for Diseases of the Heart.

HIGHAM, J P., M B., B S., appointed Medical Referee under the Workmen's Compensation Act for ophthalmic cases arising in the districts of Barnard Castle, Bishop Auckland, Durham, Seaham Harbour and Sunderland County Courts

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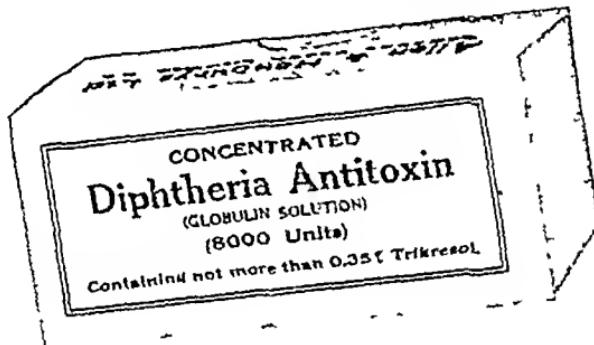
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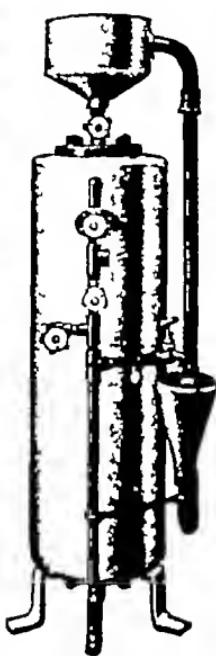
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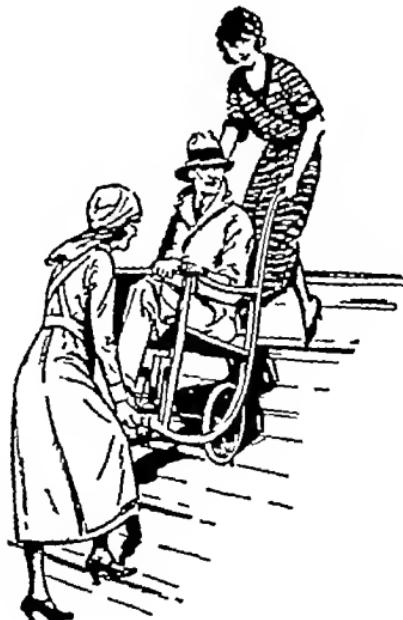
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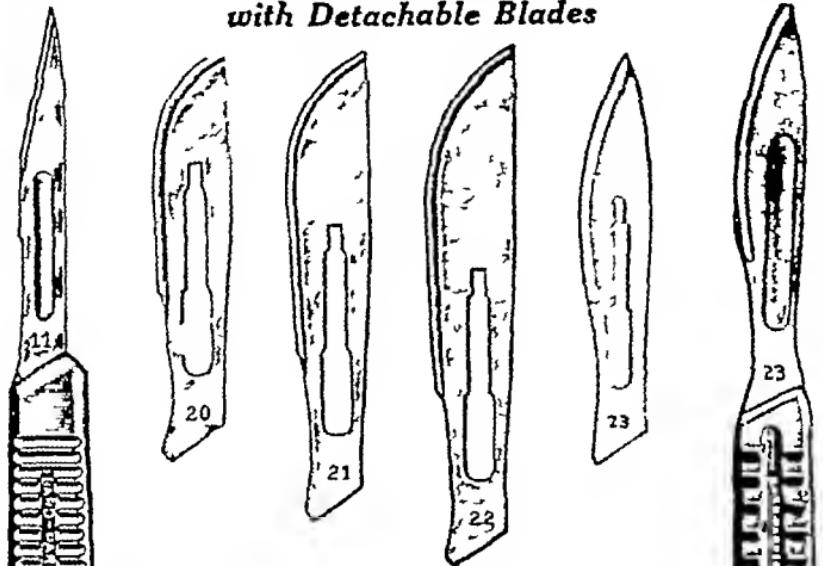
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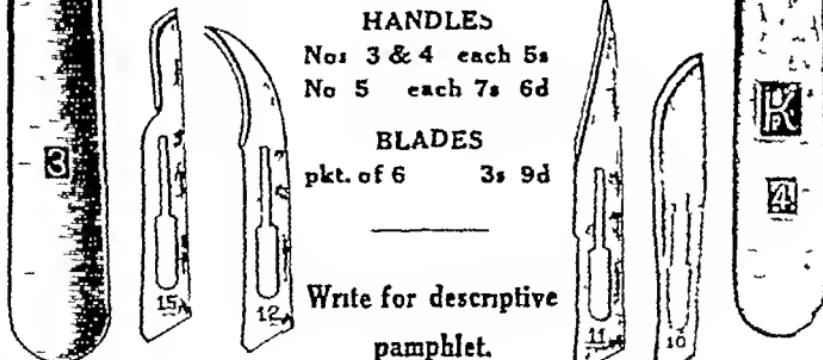
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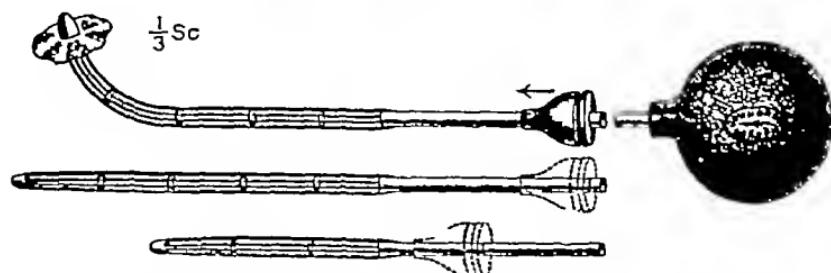
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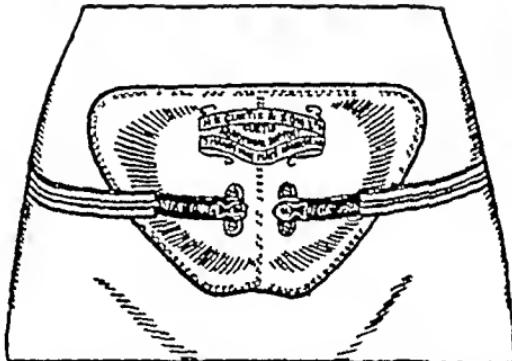
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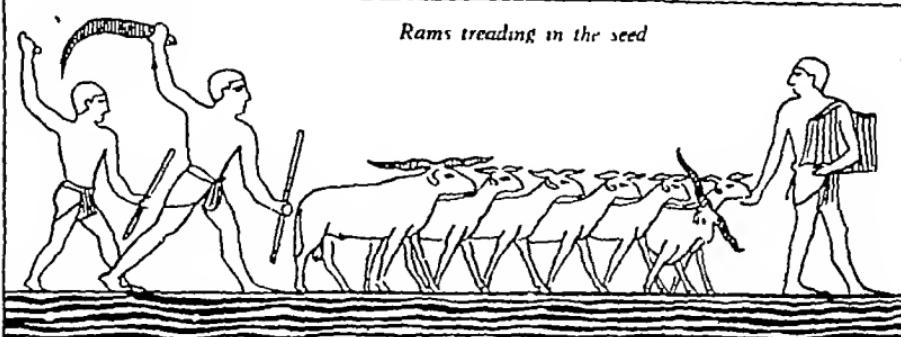
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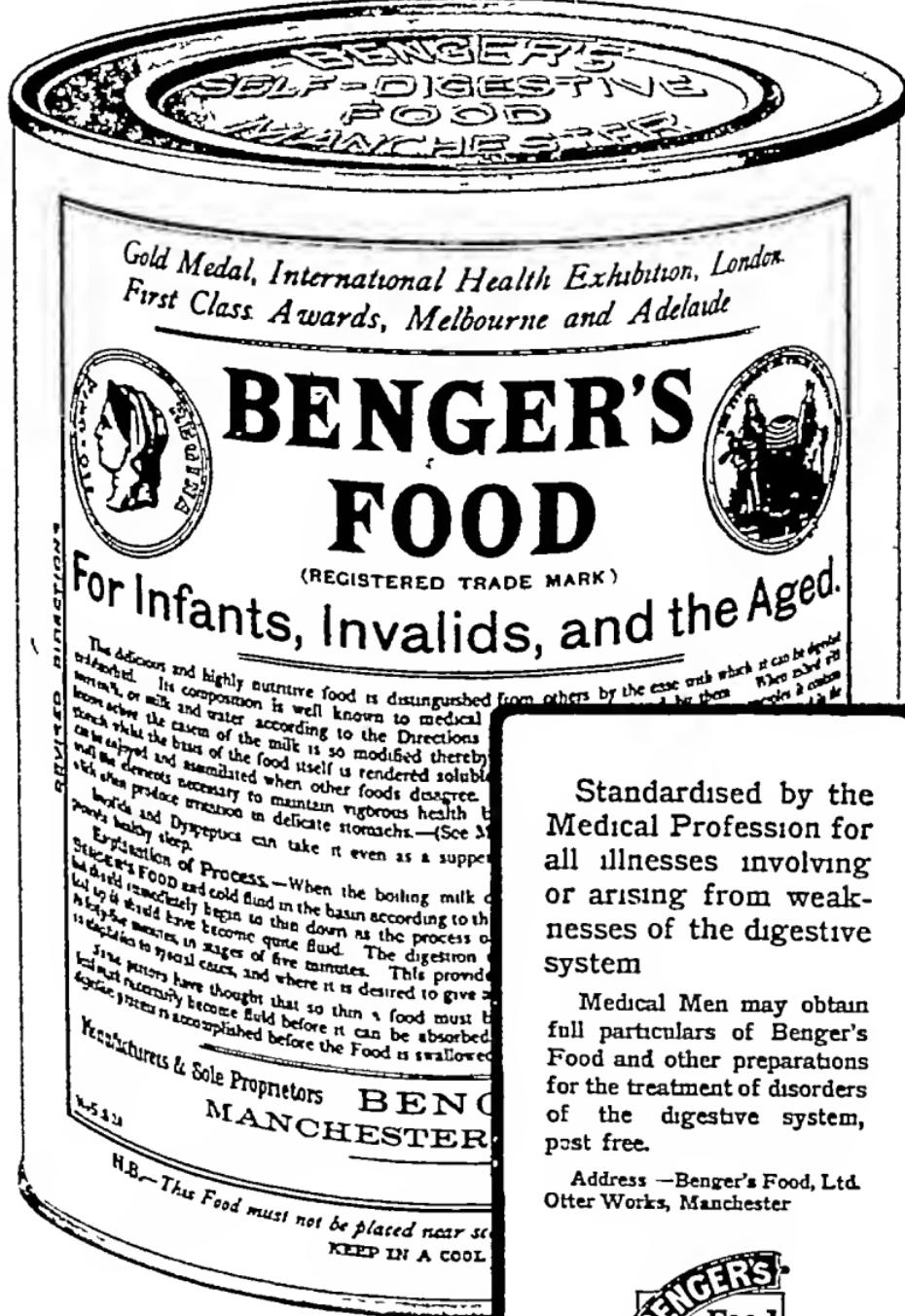
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Epitympanic Suppuration.

BY SIR WILLIAM MILLIGAN, M.D.

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SUPPURATIVE disease of the mucous membrane lining the recessus epitympanicus or "attic" of the middle-ear cleft is one of the most obstinate and at times most dangerous forms of middle-ear inflammation. As a rule it is a unilateral affection, although at times bilateral. The epitympanic cavity—that part of the middle-ear cleft situated above the level of the short process of the malleus—is about 6 mm. in height and is bounded externally by the *margo tympanicus* and by the *membrana flaccida*, or Shrapnell's membrane. It contains the head and neck of the malleus, the body of the incus, the stapes and various ligamentous attachments. Owing to the disposition of these ligaments the cavity is divided into two spaces, an inner and an outer. The outer compartment is the larger of the two, and is again divided into an upper and a lower or Prussak's space. The presence of these ligaments explains the difficulty in securing a free vent for the products of suppurative inflammation; hence

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the well-recognized tendency to chronicity in all but genuinely acute infections.

Epitympanic or "attic" suppuration may be part of a generalized inflammation of the middle-ear mucosa, more especially of its posterior or antral end, or it may be a localized infection due to the spreading of inflammation along the walls of the external auditory meatus. It is also well recognized as being frequently met with in cases of chronic Eustachian obstruction associated with infection. When the suppurative process is localized and confined to Prussak's space, as it frequently is, it is readily amenable to treatment. When, however, it is diffuse, it is often intractable and difficult to treat. As a general rule, when the infective process is acute, intense pain is complained of, especially by young children. The constitutional disturbance is also prone to be severe and the temperature high; in fact, an erroneous diagnosis of meningitis is frequently made owing to the alarming nature of the subjective symptoms. In adults, hemicrania is often present, at times associated with vertigo and frequently with tinnitus. The sense of hearing is curiously little affected when the suppurative process is confined to Prussak's space, in contrast with the severe deafness present when the infection is generalized in both tympanum and epitympanum.

In chronic epitympanic suppuration complicated with the presence of a cholesteatoma, severe and recurring attacks of pain are common, due either to retention of secretion or to suppuration round the epithelial mass. Infection of surrounding bony structures is common, e.g. the ossicular chain, the outer tympanic wall or the roof of the "attic" and antrum.

The resulting perforation of Shrapnell's membrane is often very small; so small, indeed, as at times to be difficult to see without the aid of a magnifying lens. When situated anteriorly it is frequently associated with

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chronic Eustachian obstruction, due to the presence of naso-pharyngeal adenoids, when centrally, with caries of the outer attic wall; and when posteriorly, with infection of the antral mucosa.

In acute cases, the membrana Shrapnelli is seen to be much inflamed and bulging, looking to all intents like a red currant at the bottom of the auditory meatus. The resulting perforation may be, as stated, very minute and difficult to recognize, or it may be hidden by a tuft of vascular granulation tissue or an epithelial crust. In chronic cases the discharge is frequently small in amount, blood-stained and foetid, and contains at times epithelial squames from a disintegrating cholesteatoma.

In acute cases where the inflamed and bulging membrane has not ruptured, an immediate incision should be made to relieve pain and tension and to promote drainage. To leave the membrane to rupture spontaneously is a grave clinical error. In every case where the membrane is deeply congested and bulging an immediate incision is called for, as by so doing immediate relief is given and chronicity frequently avoided. Uncomplicated acute cases, if freely drained, are prone to heal rapidly, but if drainage is inefficient, or too long delayed, as it so frequently is, chronicity is induced. Any tufts of exuberant granulation tissue should be removed with forceps, or destroyed with one or other chemical caustic, of which the most efficient is chromic acid.

To irrigate the recessus epitympanicus a special form of cannula is necessary (Hartmann, Dundas-Grant, Milligan) as the ordinary method of syringing the ear is quite useless. Any ordinary antiseptic lotion may be employed, the point of importance being that it gets "home," the anatomical peculiarities of the epitympanic region rendering efficient drainage very difficult.

To secure drainage, enlargement of the perforation,

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removal of the ossicular chain (the malleus and incus), removal of the outer attic wall, drainage of the mastoid antrum, or some form of modified mastoid operation (e.g. the conservative operation), have at various times been suggested and practised. A method of treatment highly commended by some otologists is ionization, by means of which destruction of the outer attic wall may be effected with resulting improved access to the deeply-seated disease and at the same time a freer approach for medicaments. As a method of facilitating improved drainage, ossiculectomy certainly has merits, but its performance rarely leads to cure. An even freer opening and drainage is required, combined with removal of the outer "attic" wall.

In general it will be found that with the presence of chronic attic disease there is also disease of the mastoid antrum, and that anything short of opening and draining it with or without removal of the outer attic wall and ossicular chain is of little value.

A considerable experience of the various methods mentioned above has satisfied the writer that in chronic cases the safest, surest and most reliable procedure is to open the antrum and aditus and to be guided as to any subsequent procedure by what can then be demonstrated on inspection. More especially is an antrotomy required when a cholesteatoma is present, as its existence means ultimate encroachment by pressure absorption on and infection of the labyrinthine or intracranial cavities. The rôle played by the existence of a cholesteatoma in the "attic" recess in producing erosion of the external semicircular canal and subsequent labyrinthitis is well recognized and its danger appreciated by otologists. In determining whether a cholesteatoma is or is not present in the epitympanic recess, valuable information is at times afforded by a microscopic examination of the washings obtained with the aid of an intratympanic

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cannula. The presence of acid-fast squames and cholesterol crystals is a point of diagnostic value.

Erosion of the tegmen tympani is another frequent end-result of epitympanic suppuration. The pent-up and stagnant secretions in the "attic" gradually cause ulceration of its mucosa with infection of underlying bone and subsequent perforation. The slowness of the process usually permits of a gradual thickening of the dura mater. At times, however, the softened and infected meninges give way under an advancing ulcerative process with resulting meningitis.

Reviewing the situation one is bound to admit that the existence of epitympanic suppuration is a source of real danger to the individual and its successful treatment a matter of much difficulty. To what extent the presence of nasal suppuration, septic tonsils and naso-pharyngeal adenoids affect the position is a moot point. On general grounds the removal of any and all septic foci should be undertaken, and experience shows the value of this procedure in the majority of cases. How far the theory advanced by Wittmaack of the occurrence of a "latent hyperplastic infantile catarrh" may be responsible for the chronicity of so many cases of middle-ear suppuration is at any rate a speculation worthy of consideration. Recurrences of suppurative otitis media are not by any means always prevented after even the most skilful removal of tonsils and adenoids, and it may be that the presence of a hyperplastic catarrh previous to the occurrence of suppuration plays a part, and an important part, in the resistance to treatment which so many of these cases show. In all infective disease of the middle-ear, if the cause of the chronicity appears to be want of free drainage, the problem is largely a mechanical one, and for its solution demands some form of operative interference. When, on the other hand, it is the result of lessened resistance to the infecting organism, general

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therapeutic measures are indicated. In actual practice both factors are frequently present. Vaccine therapy has, in the writer's hands, proved disappointing. Exaggerated claims have from time to time been made as to its efficacy, but in general these claims have not been substantiated.

Of the possible complications of the disease, meningitis and temporo-sphenoidal abscess are the two most frequently met with, more especially the former. Recurring attacks of headache should always be regarded as important danger signals, and as frequently the precursors of serous meningitis. In such cases the performance of lumbar puncture is indicated, as by this means it is possible to ascertain definitely the existence or otherwise of increased intracranial pressure. Any material increase is, in the writer's experience, an indication for active interference, foreshadowing, as it does, the advent of meningeal infection.

The outlook, so far as the preservation of hearing is concerned, is in "attic" cases fairly favourable. When infection is confined to Prussak's space, as is by no means infrequent, almost perfect restoration is the rule. When, however, the ossicular chain is damaged by cario-necrosis and the incus possibly exfoliated, defects in hearing are invariable, the amount of loss varying with the extent of destruction and the damage done by subsequent cicatricial adhesions. In cases where there is a concomitant labyrinthine infection a guarded prognosis should always be given.

Modern Surgery in the Treatment of Empyema.

BY FRANK J. HATHAWAY, M.D.

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SURGERY has advanced with such tremendous strides, especially as the outcome of our experience during the Great War, that now a surgeon is not satisfied with mere palliative treatment, but aims at a much higher ideal, namely, "restoration of function" of the diseased organ or part of the body.

In every branch of surgery there is, with increased knowledge, this very definite and recognizable aim at a higher ideal, and it is in chest surgery that greater advances have taken place in our time than in any other branch of surgery. Before the war, the surgeon who dealt with major thoracic surgery dared not deal with the lung as is now done. He used some method to maintain the pressure in the lung for fear of its collapse. It is now known that we can open the pleura, produce a pneumothorax, handle and operate on the lung with impunity, and with the certainty that the lung will re-expand and that restoration of function will be re-established.

It was my good fortune, as surgical specialist to a casualty clearing station in France, to have worked in the 3rd Army under the inspired guidance of Sir Henry Gray, and early in 1917 to carry out his teaching of early closure of gunshot wounds and to apply his methods to penetrating gunshot wounds of the chest. Some of the wonderful results of this method of immediate closure were published in the *British Medical Journal* of November 3, 1917. This experience decided me on my return in 1918 to apply this method of

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immediate closure to empyemas, because before the war it was considered sufficient to evacuate the pus with or without rib resection, insert a drainage tube, and leave the question of re-expansion of the lung as a minor point. It is now realized that, given the suitable case, re-expansion of the lung and restoration of its function is much more important than the mere evacuation of pus from the pleural cavity.

This is aiming at the ideal treatment, but before discussing this the surgical treatment of empyema must be considered from all its aspects. First, a distinction must be drawn between the treatment of empyema in infants and older children and adults. Among infants the mortality is so high and the operation of rib resection so dangerous that in them we must be satisfied either with aspiration repeated frequently or simple and rapid incision with drainage—or with the excellent closed method of drainage and aspiration advocated and brought forward by Poynett and Reynolds.

Secondly, after the age of infancy more elaborate methods of treatment can and should be considered. But now any method of treatment must depend on the organism which is the cause of the disease—i.e. pneumococcal, streptococcal, staphylococcal, influenzal or other causes, such as tubercle or actinomycosis. It is of great interest to notice how organisms which have their normal habitat in any one part of the human body increase in virulence when they get into any strange part of the body. For instance, the *Bacillus coli* is a normal inhabitant of the intestinal canal and we know that should it invade the peritoneum this membrane can—provided we can deal with the paralytic ileus of general peritonitis—destroy it much more readily than some years ago we believed it possible. In other words, the peritoneum is naturally highly resistant to infection from *Bacillus coli*; on the other hand, *Bacillus coli* infection of the bladder or kidney

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and the resulting pyelitis and cystitis may be of a very serious character.

Again, the pneumococcus in the lung or pleura sets up pneumonia or empyema, and we get as a result a recognized severe infection with which, given ordinary strength in our patient, the lung or pleura can deal. But when the pneumococcus gets into the peritoneum or into a joint we know how devastating and malignant the disease and the infection caused by it can be and can cause far more toxæmia than it would in its normal habitat. A streptococcal or staphylococcal empyema is a much more serious and fatal disease than a pneumococcal empyema.

A pneumococcal empyema can be treated with far more confidence than an infection caused by any other organism. Therefore the treatment of any but a pneumococcal empyema must be free incision and drainage—the object of treatment now being the saving of life rather than restoration of function. But in pneumococcal empyemas, which, after all, are the commonest, the ideal of treatment is higher, the object being early re-expansion of the lung rather than the mere evacuation of pneumococcal pus. When, therefore, the presence of pus in the pleural cavity has been definitely determined by aspiration, the first thing to do is to find out the bacteriological nature of the causal organism. The previous history of the case will of course give much help in the diagnosis.

If it is streptococcal, influenzal, or any infection other than pneumococcal, the treatment is either continued aspiration—which is frequently the best treatment in severe streptococcal cases—or free incision, rib resection and drainage. Should the lung not re-expand, some form of plastic operation, which will be discussed later, must be carried out at a subsequent date.

In a pneumococcal empyema the pleura can deal with this infection much more readily because it is

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naturally resistant to the pneumococcus.

The object in treatment then is not mere evacuation of pus, but restoration of function and early re-expansion of the lung.

In these cases wonderful results can be obtained by correct technique and immediate closure with healing by first intention.

A patient, who was in hospital under my care, had the following history :—

L T, a male aged 42, was admitted to hospital on February 2, 1929, with left-sided pneumococcal empyema. History of pneumonia five weeks ago. On operation there was a large collection of pus in the left pleura with lung completely collapsed. I washed out the chest cavity and closed without drainage.

Daily aspiration was carried out, and fourteen days after operation the wound had healed by first intention. His temperature and pulse have never risen above normal and his general condition is very good. There are still pneumococci present in the fluid evacuated by aspiration, but the amount of fluid is daily getting less. An X-ray photograph shows that the lung—within fourteen days of complete collapse—has re-expanded, and there is a very small amount of fluid to be seen in the angle between the chest wall and diaphragm. This will, no doubt, completely disappear in the course of the next few days, and we have here an ideal result. In fourteen days he is restored to health—there is complete restoration of function of the lung, and he will be saved a long convalescence.

Naturally the ideal result is not obtained in every case. Cases in which, despite the length of the illness, there are no adhesions between the visceral and parietal pleura do best. But cases with many adhesions are not so favourable.

Long-standing compression of the lung, owing to delay in diagnosis, is not so important because if there are no adhesions then, given favourable conditions, although the lung has been compressed for many weeks, it will quickly re-expand. What are the favourable conditions for restoration of function of the lung? First and foremost, I put immediate closure of the wound and by this means the abolition of a "sucking wound." Atmospheric pressure plays a large part in

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the problem because the atmospheric pressure of air with a sucking wound is greater than the pressure of air in the lung, and the frequent dressing of such an open wound, with an open drainage tube, does not give the lung as good a chance to re-expand as a closed method. A closed method of drainage, in those cases in which there is the least doubt of a successful result by first intention, should be carried out, and in any doubtful case I use a glove drain, i.e. a soft colotomy tube turned inside out, this allows pus to escape without allowing the ingress of air

In the case of a child now in hospital with a localized pneumococcal empyema, I am using this method of closed drainage because I was not satisfied that owing to adhesions of lung to diaphragm I should get a good result from immediate closure. This child is doing well. There is a free discharge of pus, and no sucking wound, and no doubt in a short time the child will get quite well with full lung expansion

The technique of the immediate closure of pneumococcal empyemata I first published in the *British Medical Journal* in May, 1920, and is as follows —

(1) Sufficient resection of rib must be made to allow the whole hand to be introduced into the pleural cavity. The object of this is threefold. First, to evacuate all the big fibrinous clots which are always present; secondly, to separate as many adhesions as possible, and, thirdly, to decorticate the lung if necessary. These last two objects are attended with much bleeding, and one can only be guided by experience as to how far one should go in this separation of adhesions and decortication. But the free bleeding will soon cease once the chest cavity is closed.

(2) After this treatment, the pleural cavity is washed out freely with a solution of 1-5,000 perchloride of mercury, because the pneumococcus is particularly susceptible to this fluid¹. I leave a large amount of this fluid in the pleural cavity and have never seen

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any signs of mercurial poisoning. The chest wall is then sewn up in successive layers, pleura and muscles, with catgut with interrupted sutures, and skin with silkworm gut.

The after-treatment is very important, and is that of continued aspiration of the fluid left in the pleural cavity. This is quite painless; an exploring syringe is inserted daily between the edges of the wound and evacuates the contained fluid. This fluid is sent to the pathological department for bacteriological examination, and in favourable cases it is found that the number of organisms per field steadily diminish until the fluid is sterile; and very soon, with rapid re-expansion of the lung, no fluid is left in the pleura. On the other hand, should this ideal result not be attained, it is then a simple matter to take out a few stitches and insert a drainage tube. No harm is done —the general condition of the patient has not deteriorated and one simply relapses to the old-fashioned treatment of an open drainage tube.

The object of the ideal treatment of immediate closure and the abolition of a sucking wound is two-fold. First, quick re-expansion of the lung, and, secondly, to prevent secondary infection. It is obvious that with an open drainage tube, no matter how carefully the sterile dressing is carried out, there must be a secondary infection of the pleural cavity.

The modern surgical treatment of empyema is not easy and has made but little progress. The ideal is very difficult to attain, but I have been distinctly gratified in many cases in which healing by first intention and immediate re-expansion of the lung have occurred. This has markedly shortened convalescence and has also done away with any resulting scoliosis.

It may be said, on the contrary, that these successful cases are those which do so well with rib resection and

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drainage I quite agree—but why not aim at an ideal method of treatment? If the perfect result is obtained so much the better. On the other hand, if any case does not do well, it is a simple matter to carry out some form of drainage afterwards and the patient is none the worse. The ideal has then been aimed at and not accomplished, but we can only endeavour. If we do not try to get an ideal result then we are not progressing on the only lines in which the treatment of empyema can progress.

To recapitulate, the three important points in treatment of pneumococcal empyemas are the following.—

- (1) An incision large enough to allow the whole hand to be inserted into the pleural cavity
- (2) Abolition of a sucking wound by immediate closure
- (3) Repeated daily aspiration.

Progress, I consider, can also be made in the treatment of an allied condition of the lung, i.e. bronchiectasis. The present-day treatment is very unsatisfactory, and I believe the right line of treatment is ligation of the pulmonary artery and division of the phrenic nerve. The object of ligation of the pulmonary artery is to produce a venous congestion of the lung with its resultant fibrosis and division of the phrenic nerve to stop the irritating cough. I have not myself had a case on which to carry out this operation, but I shall certainly do so when the opportunity arises. It has been successfully carried out by Professor Wilms.²

As regards the treatment of those cases—no matter what may be the causal organism—where the lung has no possible chance of re-expanding and again filling the rigid chest cavity, what should be done? Fortunately, these cases are exceptional and are due to neglect and want of early treatment. First, the wound should thoroughly be opened up and proper drainage

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established. If this is found to be faulty it should be placed at the lowest level of the old lung cavity and Carrel-Dakin treatment carried out. If, in spite of this treatment, the sinus does not close, it is obvious that, as the lung will not fill the thoracic cavity, the only logical course is to operate and make the rigid thorax come down to the collapsed lung. The extent of the cavity should be determined by injection of lipiodol and an X-ray photograph.

Then, following the teaching of Basil G. Beck, of Chicago, the open method of interthoracic surgery³ should be carried out. By this is meant a modified thoracoplasty dependent on the size of the resultant cavity and filling up this cavity by skin grafts or sliding skin-flaps. I have had several such difficult cases to deal with, and have had in every case an excellent result.

In conclusion, empyema presents great difficulty in treatment. The recognized and well-established treatment of this disease is given in any textbook on surgery, but until the last few years no progress has been made and it is obvious that no progress can be made except on the lines of aiming at early restoration of function of the lung. This can only be attained by immediate closure, with its four main objects.—(1) Healing by first intention, (2) early convalescence; (3) abolition of a sucking wound and secondary infection, (4) early restoration of lung function.

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Old Age and Death.

BY E A BARTON, M.R.C.S., L.R.C.P

THE study of old age—rather grandiloquently called “Gerontology”—deserves more consideration than it generally receives, inasmuch as the advance in years alters or modifies the treatment applicable to full adult life. Material is scarce outside alms- or workhouses, and cases of great age are not often admitted to hospital. Any prolonged, careful and consecutive observation, therefore, can be the more easily registered in a general practice which includes an unusual number of the aged. I happen to be in the peculiarly fortunate position of being associated medically with a large number of patients advanced in age, whom I have observed for many years.

From such observations it is borne in on me more and more that the condition of the vessels largely determines the physical and mental state of the patient, and that this condition of vessels is of greater consequence than the pressure of the blood inside them. Provided the vessels are soft and resilient a systolic pressure of 220 to 240 mm Hg in those over eighty is not necessarily associated with danger. At the present time I have under observation three men, aged respectively eighty-two, eighty-four and eighty-five, with pressures over 220 mm Hg (in one 235), who are all in active work, clear-headed, governing large businesses and with grave responsibilities. Their vessels are excellent but it is always my fear that one or other may fall into the hands of someone who will dissipate his “pathetic contentment” and prove to him how ill he has been without knowing it. As a

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contrast to these cases I have three patients over eighty whose pressures have been, and are, round about 130, whose vessels are hard and degenerate, and who are suffering from cerebral embolism, paralysis and cerebral softening. The point, therefore, to be emphasized is that high pressure in old age is not of itself a disadvantage, provided always that the vessels are above reproach.

The early psychological symptoms of arteriosclerosis are well known, the inconsequence, anecdote and prolixity of speech, the growing disregard of personal appearance, the rubbish written in the Press, the obstinacy of opinions—opinions often carrying the same weight, alas! as when the now unconscious sufferer was in full control of his wits; and I often wish that the pen of every great man commencing to exhibit such symptoms were removed from him before the naked indecency of his degeneration became exposed to a ribald world. Then gradually follow headache, giddiness, especially on bending down, slight attacks of aphasia or agraphia, or transient paresis in definite areas, due no doubt to slight interference in the circulation in the centres involved. Such attacks last for an hour or two to a day or two, it is curious how any mental strain, or excitement, will produce them, as though the centres were depleted of activity, and that time, rest and complete inactivity were essential to recovery. The intervals between such attacks lessen till there takes place either a vascular disaster or gradual cerebral softening and senility. But in such cases death comes painlessly as the patient is too dulled to realize his state.

Sydney Ringer, whose experience in these matters was very great, used to teach that the Turkish bath was not used enough when approaching age was associated with degenerated vessels and high tension, and I am sure he was right. In the summer there is less

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necessity, but in the winter a weekly Turkish bath is of the utmost value. This can be administered in the patient's own bathroom, and he can get direct from the hot chamber into the warm bath alongside him already prepared. There is no exposure to the outside air as in the journey from the public bath to his house, and the patient cools quietly in his own room. The ritual is much shortened and less severe as massage is entirely omitted, and ten minutes' sweating is quite sufficient. The only disadvantage lies in the fact that he has to sit upright instead of lying down or reclining as in the public baths. It is wise, too, for the physician personally to superintend the first bath. The sense of well-being is often remarkable, sleep is encouraged, appetite aroused and spirits raised.

Perhaps the halest old men I know—and by old I mean over ninety—are those who have ceased active work late in life, and I have little doubt that the regular habits of congenial work, even if arduous, tend towards health in age. I am not so sure that retirement from very active work in a man who has given his whole life to it is altogether good. The man whose duty calls him to the City daily, whose life is one ordered daily routine, whose meals are much the same year in, year out, who looks on his annual holiday as a concession to his family rather than as a pleasure to himself, is happier and healthier at work, even when eighty years old and over. So that monotony—call it regularity—is a feature making for healthy age. The elixir of life is hard work, and a healthy man suddenly retired on a pension at sixty from our Services or from constant, urgent and responsible work, with his brain still active, is not usually a "good life." If he wishes to grow old happily his still active brain must be utilized in some absorbing occupation, or the sudden slacking of all urge to endeavour coupled with enforced idleness and boredom, tell badly on him and he tends

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small doses, appears to give colic and loose bowels. Of aperients, Epsom salts in very old people are liable to call to stool so suddenly as to give too little time to get there, and the anus being atonic gives way, to the patient's great distress. It is better, therefore, to give an aperient which stimulates peristalsis rather than encourages fluid secretion, thus giving warning of approaching action. Hence, aloes, cascara, or senna pods are more popular with the aged. As to hypnotics, sleep in age is fully as important as food, and though few old people find difficulty in sleeping, they sometimes do so and suffer a good deal in consequence. Chloral seems to me to be the best, and even if taken nightly its activity seems in no way lessened or the dose to require increase. I have patients who have taken regularly 15 or 20 grains for years. Alcohol, when taken for the sole purpose of producing sleep, soon requires to be increased. Trional as an occasional dose has the advantage of carrying over for two nights, but for regular nightly use it is better to avoid it, as also the barbituric derivatives, which latter produce sleepiness during the following day. Opium is excellent, but tends to confine the bowels; not always so, however, and I have patients who have not exceeded their nightly dose for years.

In regard to sight, one of the saddest things is to see a highly intelligent and well-read man sitting, often alone by reason of his age, unable to kill the time of waiting by the solace of his library. He often dislikes being read to, as the reader's choice of subjects may not coincide with his own. So that with untended hands, and clothes soiled with morsels of food unseen to fall, he stares into the fire sightless and alone. For this reason all effort to retain and improve what little sight he has must be made. A cataract removed—what does risk matter, he cannot be blinder than blind—can convert such a man into a changed being, and I have

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had on two occasions patients well over ninety operated on successfully, to their intense pleasure. By the way, they always expect to see six-sixths, but their slight disappointment is soon forgotten. When nought but error of refraction interferes with sight, satisfactory glasses should be secured. In such cases the wireless broadcast is the greatest boon.

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In youth, death is a thing of terror, inconceivable, unlikely, but as age advances the fear of death, which is certain, is small compared with the fear of dying, the manner of which is so uncertain. A man seldom dies of the disease of which he is frightened, and it is this process of dying which merits some attention, for on the one hand it may be eased down to a gentle passing, or on the other, may be made even more terrible, according to the methods employed during the last stage of life. Beyond the eighties a man begins to leave behind him his susceptibility to many of the more lethal diseases. Primary cancer is not so common, primary tubercle rare, and provided there is no serious organic disease, once past the eighty mark a man enters into the quiet waters of great age and may go on much farther. At such a ripe age he has formed the habit of living, and habits are hard to break.

It is not uncommon, more generally in very old women—quite healthy—to die suddenly and painlessly, often at night. One may perhaps get a hint as to what is coming for a day or two beforehand, in drowsiness, failing interest and weaker pulse. Then the clock runs down and she dies. Under such circumstances I find some difficulty in stating in the death certificate the cause of death. "Old age" is one of the commonest *secondary* causes of death, but the Registrar-General does not countenance old folk dying *primarily* of old age. That they sometimes do so, however, and

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without the sanction of Authority I have not the least doubt; and in this connection I have before now broken a lance in a not unfriendly joust with the Registrar-General, who left the lists with his banner smirched by my uneasy suspicion that statistics were of more consequence than facts.

And now let us consider how best to let our old patient pass away without suffering. At the end of a cancer case, indeed, far before the end, pain should be relieved—nay, abolished with morphia. The friends may object and say that he will get into the habit of it, but the friends must be taken entirely into one's confidence and the matter explained, as their attitude after death must be in complete accord with the treatment. Now it is that morphia, so well borne by the aged, comes into its blessed own. I have in mind an inoperable recurrence of cæcal carcinoma. The patient, a wise old man, said: "I shall vomit myself to death," to which I replied that I would give him my word that he should not vomit at all. He never did: for when the inevitable obstruction commenced every hiccup was met by a hypodermic injection of morphia. Or a case of cancer of the œsophagus, a gastrotomy, causing the abdomen to be one large ulcer as a result of digestion by leakage of gastric juice, a tracheotomy from involvement of the larynx and an ill-fitting tube frequently coughed out, during which he slowly choked. Thus fell he into my hands imploring me to let him die. Morphia relieved him of all suffering. Or again, a case of a fine mind which had moved the destinies of nations, now grown to extreme old age and the patient senile and violent. Are we to refuse morphia to ease down his passing? As to the ethics of keeping alive a patient unconscious and already *in articulo mortis* by artificial stimulation with hypodermics of strychnine and inhalations of oxygen, I feel that such a course is open to the severest censure. An old surgeon said to a

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young doctor friend of mine many years ago: "You younger men have been taught much that we never knew, but there is one thing that you are in danger of forgetting, and that is to let your patient die in peace"

When a man is inevitably doomed to a death unavoidably associated with extreme and lingering suffering I cannot help feeling that, at his own urgent desire, means should be taken to put a term to his existence. Such means we are not at present permitted to utilize, but already there are movements towards a less inhuman view of life. We accord to a sick or wounded animal a mercy that we deny to ourselves; and I confidently anticipate the time when, in certain circumstances, Euthanasia may take its rightful place in the advance of our civilization. We shall not then be compelled to look on a patient in the extremity of irremediable torment from the standpoint of a man who himself is free from pain. The public have a confidence in the medical profession awarded to no other—not even the Church—and they look to us when the worst comes to the very worst. Let us not fail them.

The Functions of the Spleen in Relation to Splenectomy.

BY E C BOWDEN, F R C S

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THE spleen is an organ of obscure function, occupying what would appear to be valuable space within the limited area of the abdominal cavity. The significance of its connection with the vascular system would seem obvious on account of the large supply of blood it receives through the splenic artery. This large supply suggests that certain important changes in the blood take place during its transmission through the splenic tissue, and this connection with the blood system is again supported by the fact that so many of the diseases of the blood are associated with its enlargement.

Investigations regarding the functions of the spleen may be made on the following lines.—

- (1) By experiments on animals.
- (2) By investigating the changes in diseases relieved by splenectomy.

(1) *Experiments on Animals.*—Recently more and more evidence has been collected to show that the spleen, together with other certain specific cells scattered throughout the body, forms an important system known as the reticulo-endothelial system. It has been found that by injecting a solution of certain dyes, such as carmine, into the circulation, the dye is picked up very rapidly by certain cells only. These cells are-

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located in the spleen, liver, marrow and lymph nodes, and are of the same type in each situation, and the picking up of the dye is constant in every case. It is therefore possible to group together these cells lining the sinuses of the spleen and of the bone marrow, and in the lymph nodes and liver, and it is clear that there does exist a type of cell distributed irregularly in various parts of the body, all of which react similarly. A large number of these cells are found in the spleen, and they play an important part in the splenic functions.

In the work done in this direction Aschoff and Landau grouped together this special type of cell of wide distribution which is characterized by a marked affinity for certain dyes. Physiologically, one of its main activities seems to be concerned in the metabolism of iron, and to play an important part in the destruction of the red blood corpuscles and in the formation of bile pigments from the liberated haemoglobin. The normal blood-picture, which is so constant in health, would seem to depend upon an exact balance between this system where the old worn-out red cells are destroyed, and the marrow system where the new red cells are manufactured, much in the same way as the vagus and sympathetic systems balance each other, producing a normal visceral nervous control.¹

The study of the reticulo-endothelial system in its relation to immunity has, during the last few years, produced some interesting results Jungeblut,² by injecting intravenously a solution of Indian ink, inhibited the cells of the reticulo-endothelial system. The Indian ink is taken up by these cells, and if sufficient ink is in circulation the quantity taken up by each cell will so overload it that it will be temporarily thrown out of action. This process Jungeblut called "Blocking the reticulo-endothelial system." In his experiments he first blocked the reticulo-endothelial system in a series of mice by the intravenous injection

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of Indian ink. When this had been done a certain dose of highly virulent pneumococci was inoculated intra-peritoneally followed by a protective dose of anti-pneumococcal serum. As a control, corresponding doses of pneumococci and anti-pneumococcal serum were given to similar animals which had not had the previous injection of Indian ink to throw the reticulo-endothelial system out of action.

As a result of these experiments it was found that the protective action of anti-pneumococcal serum against the infection was definitely much lower in the mice injected with Indian ink as compared with the control mice without the Indian ink injection. The mortality was about double in the mice which had received one blocking injection of Indian ink shortly before the test, as compared with the normal mice. Identical results were obtained in the case of mice inoculated with tetanus. The degree of protection conferred by a dose of antitoxin against a subsequent intoxication was markedly lowered in the mice with the reticulo-endothelial system thrown out of action by a preliminary injection of Indian ink, than in the normal control animals.

It would seem that the function of the reticulo-endothelial system is to transform an inactive element in the serum into an active derivative, and if the cells are thrown out of action this transformation cannot be carried out. The results obtained by this study clearly demonstrate a lowered protective effect of anti-serum in animals with the reticulo-endothelial system blocked.

Although the results of these experiments are interesting, the deductions are still problematical, but we do learn a very important fact, and that is, that the spleen is not a single organ confined within the limits of its own capsule in the same way as the kidney or thyroid, but that it is part of a system spread widely

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throughout the body. This will explain why patients remain in perfect health after splenectomy. It is because at least some of the functions of the spleen are still being carried out by the outlying portions of the system.

Among other experiments on animals, one of the most interesting is the result of splenectomy in rats. After the removal of the spleen in apparently healthy rats, within a few days a severe anaemia develops and at the same time there appear within the red corpuscles a varying number of minute parasitic-like bodies scattered throughout each red cell. These minute bodies have occasionally been seen in very small numbers in normal rats before splenectomy, and the assumption is that they are present in most rats, but are latent until the invasion of the blood, leading to the severe anaemia, is made possible by the removal of the defensive organ—the spleen.

It has been found that the intra-peritoneal deposit of a small fragment of normal rat spleen, or the intra-peritoneal injection of a saline suspension of splenic tissue into these splenectomized rats, will cause a rapid disappearance of these parasitic bodies from the red cells. Whereas practically all rats from one area are susceptible to this anaemia after splenectomy, rats from another locality are not. If the non-infected rats are put into cages with the infected rats, in a short time they become infected, so that this disease in rats is highly contagious or infectious. The minute parasitic-like bodies in the red cells are called "Bartonella" bodies, after Barton, their discoverer,³ and this anaemia produced in rats by splenectomy is called pernicious anaemia of rats. In rats, therefore, the spleen acts as a protective organ. These Bartonella bodies in the red corpuscles are interesting, as similar bodies are found in the red cells in cases of oroya fever—a very fatal disease in man, limited to a small area near

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Peru. This fever is associated with progressive anaemia and many intra-cellular bodies in the red corpuscles—very similar in many ways to the condition found in the splenectomized rat.³

A possible explanation of all this is that in the rat the whole of the reticulo-endothelial system is confined to the spleen, and there are no outlying cells in other parts of the body. Therefore, when the spleen is removed, the whole system has been taken away, leaving the animal completely unprotected. In man, on the other hand, only part of the reticulo-endothelial system is within the spleen, and when this organ is removed there still remain many cells in other parts of the body which will continue to carry on the protective work for the individual. Suppose the entire reticulo-endothelial system could be affected in some way not yet known, so that it could be thrown out of action, then we could explain the condition of oroya fever, with the presence of the intra-cellular bodies of the red corpuscles and the associated severe anaemia, in the same light as splenectomy in rats causing a very similar condition.

For many years Dr. A. C. Coles noticed similar bodies in the red corpuscles in pernicious anaemia in man, and he was doubtful whether these minute structures seen in well-stained red cells were really only nuclear remains or true parasitic bodies⁴ Schilling⁵ also has recently described Bartonella-like bodies which he has found in the red cells in thirty-nine cases of pernicious anaemia, and these he calls the *Erythrokonten*. If these bodies seen in the red corpuscles in pernicious anaemia are parasitic in nature, it may be, in the light of splenectomy in rats, that pernicious anaemia in man is caused by a weakening of the reticulo-endothelial system due to some unknown cause, which allows the individual to be invaded by these parasitic bodies and causes the anaemia, in exactly the same way as splenectomy does in rats. We now know that

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pernicious anaemia is relieved by liver extract, and as the liver is a part of the reticulo-endothelial system we may, by giving liver extract, be supplying that which the patient has lost by a deficient reticulo-endothelial system in his own body. This deficiency—until it is made good by the liver extract—allows the growth of these Bartonella bodies and these cause the anaemia, in the same way as splenectomy produces anaemia in rats.

From these experiments it would seem that in animals the reticulo-endothelial system plays an important part in the defensive mechanism of the body, and in this system is included the spleen. How far this is so in man it is at present difficult to say

(2) *The Results of Splenectomy for Disease*—Some of the functions of the spleen may be investigated by studying the conditions found in diseases associated with enlargement of the spleen, and tracing the changes in these cases following its removal. Splenectomy is seen at its best in three conditions. acholuric jaundice, haemorrhagic purpura, and splenic anaemia. In these cases the spleen is enlarged, and certain abnormal conditions of the blood are found. After removal of the spleen these conditions rapidly return to normal, and the general health of the patient is greatly benefited.

Acholuric Jaundice—Acholuric jaundice is so called because the patient's skin is tinged with yellow, but no bile is found in the urine. It is due to an excess of destruction of the red cells with corresponding liberation of haemoglobin. This haemoglobin is broken down by the reticulo-endothelial system into bile pigments, and the body is flooded with these, but there is no excess of bile salts

The most characteristic feature in these cases is that the red corpuscles are found to be more easily haemolysed than in the normal condition. This is

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tested by noting the strength of saline in which the red cells commence to haemolyse. In normal blood this is found to appear first in 0.45 per cent. saline, while in acholuric jaundice it commences at about 0.7 per cent. saline. This greater tendency to haemolysis is known as "increased fragility of the red corpuscles," and acholuric jaundice is the only disease in which the red cells are constantly found to be pathologically fragile.

In these cases we have red cells which are more easily destroyed. The spleen is enlarged and appears to be taking advantage of the more fragile red cells. These are destroyed by the reticulo-endothelial system, of which the spleen is an important part, and the liberated haemoglobin is broken down into bile pigments. These pigments are now in excess of the liver's capacity to dispose of, and this excess in the blood appears as jaundice. The removal of the spleen effects a speedy and lasting cure—within a few days of operation the patient is free from jaundice and rapidly regains strength. From this it would seem that one function of the spleen is to destroy the red cells, presumably when they are old and worn out, but in that condition this process is in excess due to the increased fragility of the red cells. After splenectomy the remaining cells of the reticulo-endothelial system are just sufficient to maintain the correct balance.

Purpura Hæmorrhagica.—More recent work has distinguished a definite disease among the purpuras, in which haemorrhages from the mucous membranes and petechæ are prominent features and in which the blood shows a marked diminution in blood platelets. With the use of modern methods of blood examination it has become possible to define this particular type of purpura by a combination of clinical history, physical signs, and certain blood tests. To this the name of

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“Essential thrombocytopenic purpura haemorrhagica” has been given.

In these cases we have a very clear clinical picture—usually a young patient complaining of nothing except repeated unexplained haemorrhages, which later cause ill-health and severe illness. On examination nothing abnormal is to be found apart from a well-marked secondary anaemia. Examination of the blood shows a great reduction in the number of blood platelets, prolonged bleeding time (but a normal clotting time), and definite non-retraction of the blood clot.⁶

Kaznelson, in Austria, in 1916, was the first to practise splenectomy for these cases, and it is now accepted that the results of these operations are extraordinarily good, and many lives have been saved by its performance. The result in a large number of cases is immediate cessation of the haemorrhages and a rapid increase in the number of blood platelets. Spence has collected eighty cases of splenectomy for chronic haemorrhagic purpura. An examination of these cases shows that sixty-seven cases (or 81 per cent) were cured or greatly benefited by the operation, five cases were not relieved, and eight cases proved fatal.⁷

After splenectomy the blood rapidly returns to normal. This is well demonstrated by one of the two cases watched by Spence. Just before the operation the number of blood platelets was 45,800 per c mm. and the bleeding time fifteen and a-half minutes, as against a normal control of 300,000 platelets per c mm. and bleeding time of one minute fifteen seconds. Seven days after operation the platelets were 344,000 and the bleeding time only forty-five seconds. From this it would appear that the spleen is directly associated with the great diminution of platelets, because after splenectomy they immediately return to normal numbers and there is also a restoration to the normal

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of the bleeding time and clot retraction.

Under normal conditions, therefore, the reticulo-endothelial system controls and limits the number of platelets in circulation. In disease it may remove them too rapidly. The spleen forms a very large portion of this system, and if it is removed the outlying portions that remain will be sufficient to control the number of platelets in circulation. This is perhaps the best explanation we can give at present.

Splenic Anæmia.—Unfortunately, the study of the results of splenectomy in cases of splenic anæmia and Banti's disease does not help to further our knowledge of the functions of the spleen. Rosenthal⁸ and Evans⁹ have suggested that cases of splenic anæmia can be divided into two groups. In the first group, with diminished blood platelets, splenectomy usually cures with a return of the number of platelets to normal. In the second group the platelets are relatively high in number and increase to very high figures after splenectomy. These patients do not do so well. We are still entirely ignorant as to the cause of splenic anæmia and Banti's disease, and until we have more facts to work on we shall find it difficult ground to explore. But there is a strong suggestion again here that the spleen controls the number of platelets in the blood.

CONCLUSIONS.

The problem of the normal functions of the spleen is still very uncertain. In general it may be said that the spleen is part of a widely distributed system of special cells. These cells have a particular affinity to dyes or pigments, which they rapidly pick up from the circulation. Liberated hæmoglobin from destroyed red cells can be classed as a pigment of a complex structure, and it seems that the primary object of this system of cells is to deal with this liberated hæmoglobin which

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normally comes from the destruction of the old worn-out red cells. The haemoglobin is broken up in these cells into a protein and haematin, and from the latter the bile pigments are derived. These newly-formed pigments are collected from the circulation by the liver and excreted in the bile. From the alimentary canal most of these bile pigments are reabsorbed into the blood and again carried to the liver for re-excretion, so that the bile pigments are used over and over again in a complete cycle, presumably for economic purposes. Only a small trace of pigments is lost as stercobilin in the faeces or urobilin in the urine. This loss, which is small, is made up from the recently liberated haemoglobin which is constantly being formed from the destruction of the old red cells. If the bile pigments, which are directly derived from this liberated haemoglobin, were not repeatedly returned to the liver for re-excretion, the amount of haemoglobin required to keep an adequate flow of bile pigments would be so enormous that the body could not stand it, and the individual would die from anaemia. By the reabsorption from the alimentary canal of most of the bile pigments for use again, only a small call is made for fresh pigments, and these can be supplied quite easily by the reticulo-endothelial system liberating small quantities of haemoglobin as the old red cells wear out and are ready for destruction. It is estimated that each day about one-thirtieth of the total red cells are destroyed.¹⁰ In other words, the average life of a red cell is about one month before it is destroyed and its haemoglobin used to form bile pigments. Most of these cells designed to destroy the red cells in their old age are found in the spleen and can be demonstrated by the Prussian-blue stain for iron, and signs of ingestion of red cells have been noted in them also. These cells are also found in other parts of the body, but in less abundant numbers than in the spleen, and this will

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explain why splenectomy is followed by so few after-effects—it is because these remaining cells are in sufficient numbers in other parts of the body to carry on the work efficiently.

Excessive destruction of red cells, as in acholuric jaundice, will lead to jaundice, because the liver is unable to cope successfully with the increased bile pigments formed from the large supply of liberated haemoglobin, resulting in an accumulation of bile pigments and jaundice. If the spleen is removed the most important site of destruction of the red cells is removed and the reduced amount of destruction carried out by the remaining cells of the system is within the power of the liver, which will then be able to deal completely with the smaller quantity of bile pigments, and the jaundice disappears.

Exactly what connection the spleen has with regard to the control of the blood platelets it is difficult to say. These have now definitely been promoted to one of the important elements of the blood and are considered to play an important part in blood-clotting. It would seem that in some way the enlarged or over-active spleen inhibits their formation or destroys them too rapidly, as shown in splenic anaemia and haemorrhagic purpura. We know too little of the defensive powers of the body to say whether the spleen plays any part in this, but the experimental evidence would suggest that in man the spleen is part, but only a part, of this defensive mechanism.

Altogether the spleen seems to play an active part in several directions; in none, however, is it working entirely alone, but only as part of the widespread reticulo-endothelial system. The work done by these cells must be enormous. Suppose the suggestion is correct that the average life of each red corpuscle is about thirty days, it is impossible to say with certainty what the life of each corpuscle is, but estimates based

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on the rate of bilirubin excretion indicate that it is about this length of time¹⁰ We would, therefore, estimate that one-thirtieth of the total red corpuscles are destroyed daily by this system of cells If so, in a man with 5,000,000 corpuscles to cm^3 this means the destruction of about 40,000,000,000 corpuscles every hour of the day Even if the life of each red corpuscle is as long as one hundred days, as is suggested by tests in transfusion with different but compatible groups of blood,¹⁰ then at least 10,000,000,000 corpuscles must be destroyed hourly Whichever figure is correct, the task seems altogether beyond our belief The spleen very quietly carries on its work and is still an organ of mystery—in health of relative unimportance, but in disease a grave menace to life

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Ionization and Electrolysis, with Special Reference to the Reduction of Potential.

BY F. H. B. NORRIE, O.B.E., M.D., CH.M., F.R.C.S.E.
Calcutta

IONIZATION and electrolysis, or treatment based on the dissociation of medicaments by means of an electric current, has today a very wide field of usefulness in general medicine and surgery and in the specialties. The subject was, I believe, first investigated by Professor Leduc, whose book "Electric Ions and their Use in Medicine," was translated from the French and published in English by R. W. Mackenna, in 1908. In this we have outlines of the principles and application of the method which has been furthered in England by A. R. Friel, and in America by Massey and others.

Numerous writers in the varied branches of medicine have reported successes with ionization and electrolysis, but it must be admitted that we are still working on the threshold, and that much remains to be done. It is with the intention of increasing the number of workers and investigators that this article has been written for THE PRACTITIONER. It has in view particularly the source of current and its control before reaching the patient, in other words, the reduction of the current to what is necessary to do a particular work and freeing it from its faradic element. It may come as a surprise to many to know that the current utilized in treatment by the ordinary rheostat working off the main current and fitted with an ordinary 20-watt carbon filament bulb is one of 90 volts. That is to say, that between the

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limits of the rheostat we control a current of that voltage. Should the apparatus be fitted with two 20-watt carbon filament bulbs the available current is one of 128 volts. Bearing this in mind is it surprising that treatment by ionization and electrolysis is not as popular as it might be?

We have proved by records kept over a number of years that the maximum voltage required for all ionization and most electrolysis operations is 24. Only in surgical electrolysis of extensive tumours do we require more, and these do not concern the general practitioner. I would impress on all those attempting ionization of the necessity of using thick pads of at least twelve layers of Turkish towelling. This also applies to the negative pole in electrolysis operations. Disregard of this has led, to my own knowledge, to several accidents which have ranged from blisters to severe burns. The record of a few cases may be of interest:—

Chronic Suppurative Otitis Media

Case 1—Mr B, aged 45, reported on November 21, 1923, complaining of a chronic discharge from both ears with occasional attacks of vertigo since the age of four. He had had treatment in various countries at intervals all his life with only temporary benefit. He refused all operative interference. He was extremely deaf. There was great narrowing of both ear canals due to chronic infection from a thin, brownish, very smelly discharge containing cholesteatomatous debris. This narrowing rendered treatment very difficult.

Both middle ears and attics were thoroughly washed out and all cholesteatomatous debris removed and each ionized with 2 per cent zinc sulphate, 2 milliampères for twenty minutes, the right on 25/11/23 and left on 27/11/23. On 29/11/23 the left ear was dry and has remained so ever since. This ear had a partial destruction of the outer attic wall in addition to total loss of Shrapnell's membrane. Therefore we had an adequate approach for treatment, and there was efficient aeration afterwards. The right ear, however, which had loss of Shrapnell's membrane only, and therefore an inadequate opening for treatment, required nine treatments before it became dry, and it has required ionization every six months since, as the patient refused electrolysis of his outer attic wall.

The narrowing of the canals has now disappeared and one can now pass a full-sized speculum. His hearing has improved to such an extent that he can now carry on a conversation with his friends,

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and his outlook on life has completely changed since he no longer feels himself "shut off from the world"

Empyema of Maxillary Antrum

Case 2—Mr M had several teeth, including a canine with a very long root, extracted on March 14, 1928, and the following day he had severe pain on the left side of his face, and a very bad odour in his nose. He was referred to me on 17/3/28 as a case of suspected antral infection. There was nothing abnormal in the right side of his nose, but his left middle turbinate was oedematous and red, and there was pus in the middle meatus. Puncture via the middle meatus revealed foul-smelling, greenish-yellow pus. The antrum was washed clean, filled with 2 per cent zinc sulphate solution, and ionized for twenty minutes at 10 milliampères. This was followed by a headache for four or five hours.

19/3/28. No pain, no discharge, no odour, washed out antrum—very little odourless discharge. Ionized with zinc sulphate solution twenty minutes at 10 m a 29/3/28. No pain or headache, left middle turbinate still a little oedematous, antral wash after puncture absolutely clear 5/4/28. Marked improvement in general health.

The majority of maxillary empyemata with the exception of those complicated with marked polyposis readily respond to treatment by zinc ionization.

Otomycosis

Case 3—Mr M reported on January 13, 1928, having had intense itching in both ears, with discharge mostly from the left ear since September 1927. The pain had been very severe at times, had usual treatment by "drops"—hydrogen peroxide, and syringing without relief. The right ear canal contained wax, some pus and fungus growth. Left ear canal was occupied by a mass resembling black-and-white blotting paper. Syringing the canals revealed intense congestion with numerous ulcerated patches particularly in the left canal. Tympanic membrane not affected. Ionization could not be carried out that day, and he was asked to come the following morning. Microscopic examination of the discharge revealed *Aspergillus niger*.

14/1/28 Considerable recurrence of fungus growth in both canals, particularly the left. Both syringed clean and ionized 2 m a for fifteen minutes each. 15/1/28 Right ear quite dry. Left ear shows one ulcerated patch covered with pus. Examination revealed fungus still present. Syringed and ionized with zinc sulphate 2 m a for fifteen minutes, direct contact was made between the ulcer and the end of the electrode for the first five minutes, after which time it was slightly withdrawn. He left for up-country the same day. Now reports that he has had no further trouble.

Otomycosis is fortunately a rare disease at home, but very common in Bengal and prior to the advent of ionization we found it a most intractable disease. It is no longer so.

We have been particularly interested in ionization

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and electrolysis as applied to ear and nose conditions, and the range of diseases now remediable by one or both methods is very extensive, but the three cases detailed are typical of many. The cases treated in our clinic last year (1927) numbered :—

General ionizations	-	-	-	-	1,232
Ear ionization	-	-	-	-	107
Nose ionization and electrolysis	-	-	-	-	37
Total	-	-	-	-	1,376

In operating by electrolysis we sterilize as we destroy tissue, and it is impossible to spread infection as in a cutting operation, this is particularly important in nasal sinus operations and in the treatment of accessible malignant growths. Cases are all treated as outdoor patients since they are little upset by any of the procedures, and for the same reason we have a good "follow up" since they are not afraid to return to the clinic.

The Reduction of Potential of Electrical Mains by Means of Bulbs—Several years ago, while investigating the possible causes of unpleasant symptoms attending and following upon treatment by ionization and electrolysis, we directed our attention to the question of the current employed. We were surprised to find a great disproportion between the voltage in general use and that actually necessary to do any particular work. The experiments were carried out with a standard voltmeter and using the main current supply—nominally 220 volts, the actual voltage at the time each test was carried out being recorded in the last column of figures. The voltage recorded on closing the circuit was recorded under "start volts," while that obtained with the full resistance out being noted under "Full Range Volts." In other words, Full Range Volts means the voltage available within the range of the

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resistance, and being primarily regulated by the particular bulbs in use

The resistance was 800 ohms of Eureka resistance wire mounted as a rheostat. To prevent damage to the milliampèremeter during the test it was removed and its two terminals short-circuited with a piece of copper wire. The removal of the milliampèremeter does not materially alter the voltage. Two bulb sockets, connected in "series-parallel," which can be used independently by means of a switch are available on our apparatus, and where the tests show the use of three or four bulbs one or two "two-way" adaptors have been inserted into the sockets. In this way one may use one to four bulbs. The readings will be seen to give a graduated series of voltages from 3.5 to 50, which may be extended by other combinations of bulbs to 168. The following tables of voltages we have found sufficient for treatment in the various regions —

Ear, nose, and throat ionization or electrolysis, 12 volts
General ionization, i.e. limbs or trunk, 12 to 50 volts

A "filter" in the form of an Osglim bulb is used in all cases.

Faradic Element Present in Main Current — A factor which is of particular moment in ear, nose and throat work is the faradic element present in all constant currents as obtained from the electrical mains. This is most evident when a carbon filament bulb is used, as a reducer of current, such as is supplied on most apparatus sold for ionization purposes, where the source of supply is the main current. To eliminate this faradic element from the source of supply, we find that an Osglim bulb serves admirably. Osglim bulbs, we understand, were primarily put on the market as night-sign lights. After some months' use the bulb may become darkened, but this does not impair its efficiency. This darkening, we believe, is due to an

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ionic action which takes place as the current passes from one pole to the other through the gas contained in the bulb.

Another important use of the Osglim bulb is as a pole finder. With the current flowing one way through the bulb the letter, star or spiral (there are three varieties) glows, and in the reverse direction the rod or disc. By setting the bulb in its socket so that the letter or spiral glows when the positive pole of the apparatus is positive to pole-finding paper or litmus and retaining the bulb in this position always we have only to connect up the apparatus to the mains and switch on the lights to see whether we have connected up properly or not. In this way errors are eliminated. It is also possible to tell, and without danger, by means of the Osglim bulb which is the "live" wire in any system which has a live wire. Used as a "filter" in conjunction with other bulbs, Osglims do not appreciably alter the available voltage and, lastly, they consume practically no current, twenty-four hours' continuous use being insufficient for record on a standard meter.

I have to thank my friend, Mr J. Brown, of the Angus Engineering Works, Bengal, for carrying out the tests.

The Treatment of Accessible Aneurysm.

BY R. KELSON FORD, M.D.

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THE main lines of the general treatment of patients suffering from aneurysm are now clearly defined, and are indicated under the following headings:—

Rest.—Usually absolute, in bed

Diet.—Light, with moderate restriction of fluids (though Tufnell aimed at an extremely strict regime in this respect).

Excretion.—Counteraction of the slightest tendency towards constipation, and supervision of the urine, both as to the quantity secreted and as to its quality

Drugs.—Iodide of potassium or, better still, of sodium, may be administered in ten-grain doses thrice daily. It is of definite use and relieves pain, but its action is probably directed solely towards the syphilitic mesarteritis which is the usual cause. For this reason, antisyphilitic remedies should be employed as the routine treatment of the cause of the condition, but they do not cure the local manifestation. This applies to arsenobenzol, mercury, and bismuth compounds.

The results of this form of treatment alone, however, are most disappointing. Osler is said to have stated that he never saw a case cured by medical treatment. The disease may be held in check to a varying degree whilst these measures are enforced, but relapse commonly follows any relaxation, and lasting local improvement even is rare. Hence there arises the need for further measures. Hitherto, efforts have been

directed almost exclusively towards the induction of clotting within the sac. Apart from the question as to whether such a procedure, if successful, would be devoid of danger from embolism, the great drawback to all of the methods employed is the rarity with which success is encountered.

Calcium lactate, advocated in twenty-grain doses daily for four days at a time, does not appear to have any marked effect, and recent work on calcium metabolism does not offer any reasonable basis of hope, even in theory. Calcium chloride was suggested by Sir Almroth Wright years ago, but is rarely mentioned nowadays. As regards gelatine, the subcutaneous injection of ten ounces of a 1 per cent solution twice weekly for nine or ten weeks was based on the work of Lancereaux. It appears of little permanent value, and is open to the objection of difficulty of sterilization and of the subsequent occurrence of tetanus.

Acupuncture by multiple introductions of a very fine needle endeavoured to stimulate coagulation by internal injury of the sac, this is Macewen's method, learned by medical students from books, but never seen in practice. Even the addition of an electrical current does not seem to bring success. Paul's work comes under this head. Moore's method of introducing great lengths of fine wire into the sac, modified by several eminent workers, can definitely claim cures, but they amount only to about 5 per cent. Repeated small venesects do not appear to produce much clotting locally, but certainly it does tend to relieve the patient, probably by lowering the blood-pressure physiologically. An obvious improvement on venesection is the withdrawal daily of definite quantities of blood by syringe and needle.

There does not appear, however, to have been any suggestion, so far, of attempting the treatment by producing contraction of the tissues surrounding the

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sac. It occurred to me recently to try the effect of injections of quinine and urethane, as is employed for varicose veins. The result, so far, has been distinctly encouraging, but, as I do not see many cases of accessible aneurysm, this article is published in the hope that others will employ a similar method with a view to determining its effectiveness. I injected 0.2 c cm. at each of ten different areas over the surface of the sac, aiming at leaving the fluid in contact with the outer wall of the sac.

Case Notes —M. B., a widow, now aged 62 years, was first admitted to hospital on December 24, 1924. The records are meagre, but she had then a swelling in the neck, and was treated with potassium iodide. She was discharged on January 13, 1925, but was readmitted on January 12, 1927, when she stated that she had had the swelling for three years. At this period there was a swelling beneath the sterno-clavicular attachments of the sterno-mastoid muscle with vigorous pulsation in the first left intercostal space. The X-ray report stated "Aneurysm is of the aorta and is very extensive. It appears to include the whole ascending aorta, and reaches back almost to the vertebral column." The treatment adopted was calcium lactate, gr. xx, t d s for three days weekly, together with withdrawals of 50 c cm blood daily for a time. She was discharged on April 12, 1927, expressing herself as relieved, and with a note to the effect that there was no obvious increase in the local condition.

She was again readmitted on November 26, 1928, when there was now erosion of the manubrium sterni, and a large, rounded, pulsating swelling arose from the thoracic inlet in the position of the left common carotid artery. The Wassermann reaction was positive, 1 in 45, and the blood-pressure was 140/90 mm. Hg. She was treated with mercury, potassium iodide and sodio-calcium lactate (gr. xxuss, t d s) internally, together with withdrawals of 60 c cm blood daily. She expressed herself as relieved by the blood-letting. On January 9, 1929, and repeated on the 11th and 14th, intra-saccular injections of ferropyrin (Knoll) were administered without effect, 1.0 c cm of a strong aqueous solution being used. At this time the sac measured 10.5 cm obliquely from the sterno-clavicular junction in its longest diameter. Blood withdrawals were continued. On January 26, 2.0 c cm of the standard quinine and urethane solution were injected at ten sites over the wall of the swelling, and all other treatment was suspended. Some smarting was felt, and a somewhat oedematous condition appeared, which slowly subsided.

On February 28 the wall of the swelling appeared to be much thicker and pulsation was very markedly reduced. There was, however, one small area where the tissues felt very soft to the

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touch, and some anxiety was experienced as to the possible significance, though pulsation was as much reduced there as elsewhere. The maximum diameter, taken as before from the left sterno-clavicular junction, was 9.0 cm. On March 7 the injection of quinine and urethane was repeated, just as before. On March 28 the same maximum diameter was reduced to 7.5 cm., the soft area had hardened, and very little pulsation could be felt at all. The patient was greatly pleased with the improvement which she experienced.

It is quite clear that one case is insufficient for any purpose except to show that this line of treatment can be carried out and that there has been some improvement following its use. Further, this particular case has not yet been followed out to the end, so that the ultimate results are by no means certain. It was, however, explained above that the purpose of publishing this communication is that others may try this or some similar procedure.

Albumen in the Sputum as an Aid to the Early Diagnosis of Pulmonary Tuberculosis.

By PERCY MOXEY, T.D., M.B., C.H.B., L.S.A., D.P.H.

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MOST practitioners will agree that the earlier we can make a definite diagnosis of pulmonary tuberculosis, and the earlier we can commence treatment the greater the chance of bringing about arrest of the disease with the possibility of eventual cure. The diagnosis is based upon :—

- (1) The history of the case.
- (2) Physical examination of the chest.
- (3) X-ray examination of the chest.
- (4) Observation of temperatures.
- (5) Examination of the sputum.

Now, in the very early cases there is very little to go upon : maybe some history of lassitude with slight loss of weight, the presence of a slight cough with a little expectoration, and on physical examination you may find a slight alteration in the percussion note at one apex with some alteration in the vocal resonance, *nothing* very definite, the radiogram may be of no assistance, as in these early cases there is little or no consolidation, and consequently there is no shadow thrown, and again, in the case I am picturing the temperature will be of no use as a guide, as in all probability it will be normal.

The sputum does not always show the presence of the tubercle bacillus in the early stages—indeed, it is often not found until the disease is well advanced—and

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yet it is the one test on which so much reliance is placed by most medical men, in fact, the absence of the tubercle bacillus from the sputum is often considered a sign of a favourable nature

As an aid to diagnosis much more reliance can be placed upon the result of the examination of the sputum for the presence of albumen. Albumen is almost constantly present in the sputum in pneumonia, pulmonary oedema and pulmonary tuberculosis, it is usually absent in bronchitis, and the differential diagnosis of these should not be a matter of very great difficulty. At my clinic the sputum of all cases is examined for the presence of both the tubercle bacillus and albumen, and it is interesting to note that in all cases in which tubercle bacilli were found, albumen was also detected, and, moreover, the quantity of albumen as estimated by Esbach's test is proportionate to the numbers of bacilli present.

In a previous article¹ I gave some figures which need some correction in view of work which has since been done with many more cases. In all cases the numbers of bacilli in ten microscopical fields are counted, and I have found that when there are five or fewer present in ten fields the average amount of albumen present is about 0.06 per cent.; with twenty bacilli present it increases to 0.09 per cent., with fifty present to 0.1 per cent., with 100 to 0.11 per cent., and with 500 to 0.13 per cent. or more. This is, of course, what would be expected, as the greater the amount of diseased pulmonary tissue the larger will be the numbers of bacilli present and the greater the quantity of albumen found. Wanner² states that the number of bacilli present is not necessarily of value in prognosis, but that the amount of albumen present is proportionate to the extent of the lesion; but my own observations show that the numbers of bacilli and the quantity of albumen bear a very constant relationship to each

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other and also to the extent of the pulmonary lesion; they are of distinct value in estimating the extent of the disease, and therefore helpful in prognosis.

It seems reasonable to suppose that if albumen is always found when tubercle bacilli are present, then the presence of albumen, even if tubercle bacilli cannot be detected, must be of considerable importance in the diagnosis of a pulmonary lesion, and in actual practice I find this to be the case. All cases sent up to me for diagnosis in which albumen is found in the sputum are kept under observation and treatment. Observation of a large number of cases over a long time shows that in many of the cases in which at first only albumen is found in the sputum, examination at a later date reveals the presence of the bacillus. These cases, which are at first negative, rarely show more than 0.05 per cent. of albumen, should there be much more than this, then a more careful search will almost certainly be rewarded by the discovery of the bacillus. I have been much struck by the fact that with careful technique it will be found that several examinations of the same sputum at short intervals will give very similar results, which tends to show that the method is scientifically sound.

It is perhaps worth quoting the main results of over 2,500 examinations of sputum from cases sent up for diagnosis during the last few years. Some 25 per cent showed the presence of both tubercle bacilli and albumen, nearly 50 per cent had albumen only present, and in the remainder both were absent. During the past four years there have only been two cases in which bacilli were present and albumen absent, and in both these cases albumen was found on carrying out a second test. It was not found practicable to follow up the "negative with albumen" cases to see in how many instances these cases became positive; but the

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records of a large number of positive cases have been looked into, with the following results :—

74 per cent showed the presence of both bacilli and albumen at the first examination

16 per cent gave albumen only at first, but on subsequent examination the tubercle bacillus was found

5 per cent at first positive with albumen, later became negative with albumen

3 per cent were negative with no albumen, later became positive with albumen

2 per cent were negative with albumen, then positive, later on became negative again, and the albumen finally disappeared.

A further investigation into the records of a number of cases that died shows, according to the results of the sputum examinations, the following results —

65 per cent were positive, with albumen

17 per cent were negative, with albumen

11 per cent were at one time negative, with albumen, and later became positive, with albumen.

7 per cent were negative, with no albumen

This last 7 per cent had only one sputum test each, and can therefore be placed aside as unreliable. I have also had several cases in which albumen has been present from the first, but in which the tubercle bacillus has only been found a week or so before death

The method of quantitative examination of the sputum is as follows.—

(1) To 10 c cm of the sputum add 30 c cm of 1 per cent acetic acid and shake until thoroughly mixed. This causes precipitation of mucus

(2) Filter through filter paper

(3) Test filtrate for albumen qualitatively and quantitatively

The sputum must be fresh, otherwise a negative reaction may have changed to a positive owing to disintegration of cells

Esbach's method — Fill the tube to mark U with filtered sputum

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and to mark R with Esbach's reagent (picric acid 1 gm, citric acid 2 gm, distilled water to 100 ccm). Cork and allow to stand for 24 hours, then read off height of precipitate. This gives the amount of albumen in grams per litre and must be divided by ten to obtain the percentage.

A further investigation, which I intend to carry out at the first opportunity, is to find if there is any relation between the total quantity of albumen found in the sputum *per diem* and the severity of the disease; this quantity can be found by measuring the total amount of sputum daily and then estimating the grams of albumen per litre by Esbach's test, a simple calculation will then give the total quantity for the day, and it may be found that this will be a useful guide to the severity of the disease.

To conclude, the presence of albumen in the sputum in the absence of pneumonia or pulmonary oedema is very strong evidence of a pulmonary lesion, due probably to the tubercle bacillus, and treatment should be commenced accordingly and not delayed until the presence of the tubercle bacillus can be demonstrated, as by this time the disease is almost certainly well advanced and much valuable time has been wasted.

References.

¹ *British Journal of Tuberculosis*, Oct., 1928.

² *Deut Arch f Klin Med*, Bd 75, 1903

Re-educating Cleft Palate Speech.

By W KINGDON WARD

Instructor for Speech Defects at the West London Hospital and the West End Hospital for Nervous Diseases

AFTER closure of a cleft palate has been effected there remains the question of the speech, which in most cases is nearly incomprehensible except to those most closely connected with the patient. Surgery, while paving the way, can of itself do nothing to help the speech directly, it is purely a matter for re-education

From first to last the chief difficulty, and that on which one mainly concentrates, is the velum, in which there is often an almost complete lack of functioning power. Most of the exercises, therefore, are directed towards re-inducing this, and once the trouble is partially overcome there is a noticeable lessening of the all-pervasive, "fluffy" nasal tone, as well as the development of ability to pronounce various sounds which previously were wholly or partially lacking.

If the closure of the hard palate is incomplete, "S" and corresponding sounds may be practically impossible of utterance, and if there is a large gap in the teeth the difficulty may be considerable, but in either case it can be partly or wholly obviated by the use of a plate. The latter, however, can do nothing towards setting free the action of the velum

In some cases, while the latter is not raised enough to prevent emission of breath through the nasal passages, the patient can yet lower it sufficiently to form the "G" and "K" sounds without difficulty, but at the same time the "D" and "T" sounds may be

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lacking. Thus one patient at the West London Hospital would always say "kake" for "take," "gok-kor" for "doctor," "gig" and "gig-nk" for "did" and "didn't," etc. In this case the child had great difficulty with frontal sounds, while retaining some power in the velum. As usual the easiest way had been found and taken, and the tip of the tongue, until trained, remained practically unused. Another patient contented herself with the use of the "glottal stop" for every one of the plosive sounds. Naturally her speech was peculiarly unintelligible.

It may be noted, in passing, that the presence of a nasal tone does not necessarily imply escape of breath through the nose. For instance, one may say or sing the French word "un," prolonging the final sound, which is strongly nasal, and then pinch the nose between finger and thumb, still continuing the sound. The tone will be somewhat deadened, but the nasal quality will in no wise be changed. This quality of tone is due to the velum being only partially raised, with a correlative position of the tongue.

Obliging the patient to use the back of the tongue will help to induce corresponding velum action. One way of working towards a non-existent "K" sound is to make him (or her) breathe noisily out through the glottis (almost as though hawking, but with less violence), and then try to stop the sound suddenly, "at the top." It must, of course, be done by imitation of the instructor, and should only be done two or three times on any given occasion, as it is hard on the throat and is liable to produce discomfort if persisted in. Nevertheless, it is often efficacious.

Another way is to get the patient to open the mouth wide, tuck the tip of the tongue well down behind the lower front teeth, keeping it pressed against them, and then get him to try and say "T." The tongue tip must not, of course, be allowed to rise to

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the hard palate. At first it will automatically do so, but if the patient is persuaded that it has to "stay put," this will be regarded as a kind of game, and he will learn to keep it there. I always prefer this way to using a tongue-depressor, since it helps towards muscular control. After a time the effort to say "T" under these conditions will result in "K." It should be noted, however, that this exercise is of no use in cases where the patient has never attempted "T."

"S," provided there is no absolute hindrance (dental or surgical), may be achieved in the following way. Get the patient to put the tip of the tongue between the teeth, and say "Th," and while prolonging the sound, slide the tongue slowly inwards and upwards against the inside of the upper teeth, until a point is reached at which "S" is automatically produced. After some practice he can usually get the tongue tip in the correct position and sound the "S" without the preliminary "Th."

Where the "T" sound is lacking it may be produced by making the patient say "Th," and then draw the tongue back smartly against the hard palate just behind the top teeth while continuing the sound. But this often requires much practice, and incomplete closure of the hard palate would greatly increase the difficulty. In such cases the aim should be to make the "T" as far forward against the teeth as possible. Another method is to make him press the tongue tip tightly against the hard palate, and then, while holding the nose, alternately press the breath against the closure and relax the pressure, before attempting its release on the plosive sound. Yet another way is to get him to make the plosive with the tongue in position for "Th," thus ensuring sufficient resistance. The sound will be slightly thick, but the tongue can be gradually worked farther in.

Much of the practice, at any rate at first, must be

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done while pinching the nostrils together between finger and thumb, so as to prevent the escape of the breath *via* the nose. When the breath is thus forced into the right mode of egress, by being prevented from taking the wrong one, it is the beginning of habituating it to do so, and at least something may be done, through exercises, towards a *voluntary* directing of it away from the nasal passages, and confining it to a passage through the mouth, even where the closure from the nasal passage is not complete. The holding of the nose should frequently be alternated with an experimental letting go.

The following exercise is excellent. Let the patient (a) close the lips and sniff fairly rapidly several times in and out through the nose, (b) pinch the nose between finger and thumb, and meanwhile draw the breath quickly in and out through *nearly* closed lips (making a sound of which the French word "siffler" is suggestive), (c) the same as (b), at intervals loosing the hold on the nostrils and immediately resuming it. The breath, being strongly directed through the lips, hardly has time to return to the wrong direction. The intervals of letting go can gradually be lengthened.

The three parts of this exercise should be alternated. Keeping the lips close together in (b) gives the *sensation* of breath *on the lips*, so that the patient is conscious of its egress in that way far more than if the mouth were quite open. The alternation impresses on him the *difference of sensation* between breath emitted through the nose and that emitted through the lips, and thus helps him to direct it by consciously aiming at the sensation corresponding to the required mode of emission.

It is desirable to get the jaw and tongue to work independently, and as much under control as possible. Therefore give exercises (a) in dropping and closing the jaw quite loosely, without moving the tongue or any

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other part more than is inevitable, and (b) in various independent movements of the tongue putting it out and drawing in, on the words "out," "in," and moving the tip upwards to the hard palate and down to the lower teeth, on the words "up," "down" Before this is done the tongue should be completely relaxed

If a patient is told to make, or keep his tongue loose, or *not* to do anything with it, he will unconsciously and inevitably try to *do something* with it, and it becomes at once the notoriously "unruly member" The mere fact of an injunction of any kind with regard to it naturally results in physical effort, instead of cessation therefrom The tongue should not even be mentioned to the patient, but to get it to lie flat and relaxed in the mouth, he should be told to open his mouth wide and breathe in audibly through it, and *feel* the cold air as it goes down his throat Attention is taken off the tongue and directed to something else which cannot interfere, and action, also non-interfering (some kind of action being practically irresistible), is ensured I have never yet known this to fail Incidentally, too, it opens the throat

Control of the velum is also helped by getting the patient to breathe at will through the nose with the mouth open This can be done by means of the following exercise (a) Say "King" (or "Hing") (b) Repeat, with the mouth well open and tongue against lower front teeth. (c) Same as (b), prolonging the final "ng" sound (d) Repeat in same way, but at signal, stop the *voice* sound of "ng" and simply continue the outward breath through the nose (e) The same as (d), but at the end snuff the breath several times in and out through the nose (All the time the mouth must be kept well open and tongue down) (f) Do this without the preliminary word (g) Alternate this with breathing in and out through the mouth, first holding the nose, then without

All the work on speaking sounds should be done on

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consonants. The sharper the articulation can be got, the more the velum muscles tend to come into line, and the better the vowel tones, as the nasal tone gradually tends to become less pronounced. Although it is perhaps too much to hope that cleft palate speech, in most cases, can ever sound quite like that of a normal speaker, the improvement possible is so great that whereas in its untrained state it remains practically unintelligible to all but near relatives, as a rule after re-education none but those hard of hearing or comprehension could fail to understand the speaker perfectly.

Practical Notes.

A Domestic Liver Extract for Use in Pernicious Anæmia.

W B Castle and M A Bowie point out that the sufferer from pernicious anæmia, like the diabetic patient, must frankly face the necessity of continued attention to his treatment probably for the rest of his life, fortunately to a somewhat less exacting degree than is the case of the diabetic patient. In the economic aspects of the treatment of pernicious anæmia, however, the medical profession is confronted with a considerable problem, for at present it appears desirable for most patients to continue to take daily, either raw or cooked, about 200 grams of prepared liver, or the extract derived from 300 grams of liver. The cost of the many effective commercial liver extracts is considerable, and the most palatable calf's liver is nearly half as expensive as the extracts. By using the cheaper kinds of liver, however, such as beef liver, the expense is greatly reduced. A process is described by Drs Castle and Bowie by which it is possible for any reasonably intelligent person to make from inexpensive beef liver an extract effective in the treatment of pernicious anæmia. The expense of the process, apart from the initial cost of the utensils needed, which are found in most kitchens, is practically the cost of the liver alone. With a little experience the time involved should not be greater than half an hour daily. The extract so produced should not exceed in amount two ordinary tumblers of a liquid tasting very like beef tea, and almost entirely free from the peculiar flavour of liver which offends many patients. The utensils needed are a meat chopper, a quart rubber-sealed jar, two enamel saucepans, a wire strainer (mesh about seventeen to the inch), a tablespoon, unbleached fine mesh cloth and a drinking glass.

(1) In the evening somewhat more than half a pound of beef liver should be ground twice through a meat chopper, the finest cutter being used. (2) One glassful of the liver pulp, with one and one-half glasses of cold water, should be placed in a quart rubber-sealed glass jar, shaken vigorously for five minutes, then put in the icebox and allowed to stand overnight, being shaken again if possible during the evening. (3) In the morning the jar is removed from the icebox and again shaken vigorously for five minutes. Then the reddish-brown liquid (L_1) is strained off with a medium fine wire strainer (mesh about seventeen to the inch). The liver pulp (P_2) remaining in the strainer is replaced in the quart jar with one and one-half glasses of cold water, shaken five minutes, and again put in the icebox until evening. (4) The strained liquid (L_1) should be placed in an enamel saucepan and heated, with constant stirring, over as hot a flame as possible. The liquid will turn brown and curdle. The liquid should be allowed to boil only for an instant, then

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saucepans is removed from the fire and cooled as rapidly as possible by immersion in cold water, until it is possible to squeeze the contents through double unbleached cloth after the manner employed in making jelly. This will give a slightly cloudy yellow liquid (E_1) and leave a dry pulp in the cloth. (5) The dry pulp from the cloth is replaced in the saucerpans and from one-half to three-fourths of a glass of warm water (40°F) added. This is stirred until the pulp is thoroughly broken up again, and then strained as before through the cloth. The second yellow liquid (E_2) is added to the first (E_1). The dry pulp is then discarded. (6) There should be about two glasses (500 cm) of the yellow liquids (E_1 and E_2) combined. This is the extract to be taken by the patient in one day. It may be taken hot or cold. Salt adds to the flavour. If re-warmed, it should be kept well below the boiling point. (7) On the second evening, and on each evening thereafter, the jar containing the original liver pulp (P_2) which is being extracted for the second time, is removed from the icebox, and, after being shaken five minutes, the available liquid (L_2) is strained off, exactly as in procedure (3). This liquid (L_2) is used instead of the one and one-half glasses of water with the new liver pulp as in procedure (2). The object of this is to secure a double extraction of each day's raw liver pulp without increasing the volume of extract.—(*Journal of the American Medical Association*, June 1, 1929, p 1830.)

Chronic Gastric Catarrh and its Treatment.

W Zweig discusses the clinical features, differential diagnosis and treatment of chronic gastric catarrh, and points out the diagnosis of the condition depends on the presence in the stomach of large quantities of mucus unaccompanied by signs of ulceration. The hydrochloric acid in the stomach contents may be high in the early stages owing to irritation of the gastric mucous membrane, but low when this begins to atrophy and may progress to complete achylia gastrica. Motility of the stomach is greatly diminished. The condition is one which can exist for many years and affects the patient's psychical well-being. Sleeplessness, headache, inability to work well and hypochondriacal manifestations may make the differential diagnosis from nervous dyspepsia very difficult, especially as typical dyspeptic pains may also be present. Variability in the symptoms is in favour of nervous dyspepsia, whilst aetiological factors such as excessive drinking, misuse of purgatives, or the presence of obvious septic foci will often indicate the organic condition. Repeated negative examination of the stools for occult blood would be strong evidence against early carcinoma which might well simulate a chronic gastritis. Diet is of paramount importance in treatment. Small meals of a high carbohydrate content are recommended, all food being given as far as possible in puree form. Fat and protein are badly tolerated and small amounts only should be allowed. Alcohol is strictly forbidden, but mineral waters are of value and may be taken in large quantities. Medicinal treatment consists in improving the appetite by means of simple bitters. Dr Zweig administers a mixture of hydrochloric acid with

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pepsin before meals —

R Acid muriatic dil	-	-	-	-	5 parts
Pepsin germanic	-	-	-	-	
Aquam ad	-	-	-	-	50 parts

Sig One teaspoonful in a wineglassful of water to be taken through a glass tube. For the painful dyspeptic symptoms tint valerian aether in 10 minim doses after meals may be useful, or menthol 0.05 gram in gelatin capsules may be given, while it may be necessary to combat pyloric spasm by means of tint belladonnae 10 minims after meals —(*Wiener Klinische Wochenschrift*, April 18 1929, p 567)

The Treatment of Cancer of the Rectum.

M. Hartmann publishes an analysis of his cases of cancer of the rectum, and comes to some interesting conclusions. In this series there were 505 patients, of whom 413 were operated upon in his clinic. In 203 of the cases a palliative operation only was done, left iliac colostomy being carried out, without muscular section, simple separation of the muscle fibres being done to prevent a late evagination of the bowel. Professor Hartmann has not found that good results followed radium therapy combined with the palliative operation. In 130 cases a perineal amputation of the rectum was carried out, with resulting case in 50 per cent of cases, and in 73 cases an abdomino-perineal amputation of the rectum was done, with a case in 64 per cent of cases. The immediate post-operative mortality in the abdomino-perineal resections was however, decidedly higher —(*Paris Médical*, April 6, 1929, p 328)

The Treatment of Small Benign Tumours of the Face.

L K McCafferty and V A Lopez group under this heading adenoma sebaceum, multiple benign cystic epithelioma, tricho epithelioma, syringo-cyst-adenoma and hidrocystoma. From the embryonic point of view, all of these tumours are related, they are all derived primarily from the ectoderm. But it may be stated that, with the exception of adenoma sebaceum, the rest of these tumours are clinically almost impossible to differentiate. In view of the fact that they are all quite superficially situated in the skin, the best and quickest method is desiccation, but it must be done very superficially with an extremely fine spark —(*New York State Journal of Medicine*, June 1, 1929, p 654)

The Local Treatment of Suppurative Conditions of the Lung by Intrathoracic Injections

H Edel describes the method he has adopted as a compromise between surgical measures and conservative therapy in suppurative lung conditions. Eight cases of gangrene, abscess, empyema and bronchiectasis have been treated by intrathoracic injection of neosalvarsan, with favourable results. Several cases were un-

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suitable for surgical treatment owing to their bad general condition consequent upon long duration of the illness. Technique consists first in aspiration of pus from the septic cavity when possible and then the injection into it of 0.15 gram of neosalvarsan. This injection is repeated every four to five days in increasing doses up to 0.6 gram, the doses being regulated in each individual case. In cases of bronchiectasis Dr Edel injects the neosalvarsan through a laryngeal catheter passed into the trachea, the larynx and trachea having previously been anaesthetized with 20 per cent cocaine and the bronchial tree through the catheter with a 2 per cent solution. The patient is placed on the affected side, and 0.15 gram of neosalvarsan is injected into the bronchial tree, followed by a cubic centimetre of distilled water to ensure that all the drug reaches the bronchi. Further doses up to 0.6 gram may be injected as in abscess or gangrene of the lung—(*Medizinische Klinik*, April 26, 1929, p 668)

Splenectomy in Haemolytic Jaundice.

F Widal, L de Gennes and M Laudat report an interesting case of splenectomy in haemolytic jaundice. Five days after operation the jaundice had disappeared, and two months later the blood-count was normal. A few months later jaundice, anaemia and cholæmia began to appear, however, whenever the patient became fatigued, and there was an increase in cholesteræmia and a decrease in the fragility of the red blood corpuscles—(*La Presse Médicale*, April 20, 1929, p 513)

The Treatment of Sciatica by Light Therapy.

R F Weiss recommends the intensive use of the quartz lamp for the relief of sciatica. He insists that it is necessary to use very long exposures and to produce a true irritative erythema. This must be explained to the patient before treatment is undertaken, and suitable applications of soothing powder and ointment must be made to allay the intense irritation produced by the skin lesion. The region of each sciatic nerve is divided into two fields, one from the lower extremity of the thorax to the gluteal fold, the other from the gluteal fold to the calf. Each of these fields is exposed on four to six alternate days to the quartz lamp at a distance of from 60 to 80 cm for from ten to twenty minutes. It may be necessary to repeat the whole treatment after four to six weeks. Good results have been obtained in cases of sciatica which have failed to respond to the usual remedies—(*Medizinische Klinik*, April 12, 1929, p 600)

The Treatment of Vesico-Intestinal Fistulæ.

Hamilton Bailey observes that in the treatment of vesico-intestinal and urethro-intestinal fistulæ each fistula must be treated on its merits. When frank malignant disease is palpable per rectum, a blind left inguinal colostomy with a good

PRACTICAL NOTES

spur will prevent the faeces from entering the urinary tract and render the patient more comfortable. In non-malignant recto-urethral fistula, a suprapubic de Pezzer catheter fixed to Cathcart's evacuator gives the fistula a chance to heal. If the fistula fails to heal in a matter of months, operation may be considered, and the perineal route is probably the most satisfactory for this purpose. In all other types, as soon as the general condition of the patient permits, laparotomy should be performed. The most satisfactory condition to treat is when the appendix or cæcum, found adherent to the bladder, and separation of the organs, dissection, together with appendicectomy, can be undertaken in one sitting, the perforation of the bladder is closed and covered with a free omental graft. When the small intestine is found to be the source of the trouble, the same principles may be adopted. The lesion most frequently to be found is an adherence of the pelvic colon to the bladder. After the patient has been placed in Trendelenburg's position, and the area carefully isolated by packing, the two organs may be separated, and after the resulting hole in each is sutured a free omental graft will strengthen the suture line in each case. If a large mass is found, it is necessary first of all to drain the colon.—(*British Journal of Urology*, June, 1929, p 175.)

Earache of Buccal Origin.

M Truffert records three cases in which the chief symptom was intense earache, but examination of the ear showed no sign of inflammation and a normal tympanic membrane in each case. In the first case, examination of the mouth and throat showed a small cryptic abscess at the inferior border of the right tonsil, and opening this caused the earache. In the second case, examination of the mouth showed an impacted wisdom tooth, and after removal of the tooth the earache disappeared. In the third case, there was, in addition to the earache, an enlarged submaxillary gland, examination of the mouth showed that the symptoms arose from a calculus in the duct of the submaxillary salivary gland, and with the removal of the calculus all the symptoms disappeared.—(*Journal des Practiciens*, June 8, 1929, p 380.)

X-Rays and Ultra-Violet Rays in Dermatology

E Thorpe insists that many common skin diseases will benefit by irradiation. Ultra-violet rays are easier to apply, the measurement of the dose is not difficult, but it is only in comparatively few conditions that they accomplish much. X-rays, on the other hand, will often produce the necessary therapeutic effect in skin diseases after only one application. Ultra-violet rays will very rarely produce the necessary effect at once. Prolonged ultra-violet treatment is usually necessary and is practically free from danger, but prolonged X-ray treatment is not always necessary, and apart from malignant conditions is hardly ever desirable.—(*Birmingham Medical Review*, May, 1929, p 137.)

Reviews of Books.

Recent Advances in Psychiatry By HENRY DEVINE, O B E , M D ,
F R C P Pp vii and 340 London J and A Churchill, 1929
12s 6d net

In his preface to this addition to the now well-known "Recent Advances" series, Dr Devine states that when preparing the volume made it his principal aim to keep the psychotic patient always in the foreground. That is the impression conveyed by the book. The conception of the patient, the nature of his affliction, and by what means he may be restored to mental health is never sacrificed to the discussion of theories which have no practical significance. The opening chapter on the fundamentals of psychiatry is an excellent introduction to a difficult subject whilst the section dealing with the relationship of somatic factors to the psychoses embodies within a reasonably small compass the monumental amount of work on this subject which has been done during the past few years. The chapter on malarial therapy contains a number of interesting statistics of results and forms a valuable comparison with similar treatment from the point of view of the neurologist as given in "Recent Advances in Neurology". In the chapter on the Psychoses, the work of Freud and Adler is discussed at some length and certainly without bias. Most psychiatrists will agree with Dr Devine when he says "From the standpoint of psychiatry it would seem most desirable that the psychoanalytic school should outline their fundamental principles in simple psychobiological terms. What is needed now is more facts and less theory". A name index has wisely been inserted in addition to the general subject index, thus facilitating reference to the work of a particular writer. The essential impartiality of the author on disputed points will commend the book to many who might expect in a volume on psychiatry the obtrusion of the writer's personal views, and in particular to the general physician, in whose practice knowledge of the latest developments in psychiatry is indispensable.

Indigestion Its Differential Diagnosis and Treatment, A Clinical Handbook for Practitioners By H J PATERSON, C B E , M C , M D , F. R. C. S. Foolscap, 4to, pp vii and 153 Figs 4 London William Heinemann (Medical Books), 1929 7s 6d.

MR H J PATERSON, well known for his surgical work on the alimentary canal, and especially on the stomach, has now written this clinical handbook for practitioners without much reference to pathology or statistics. Surgical dyspepsia has with the advances of abdominal surgery, and the study of "the pathology of the

THE PRACTITIONER

1

living" so ably insisted upon by Lord Moynihan, become a well-recognized conception Mr Paterson at the onset classifies in digestion in three categories (1) secondary to causes outside the stomach, such as chronic appendicitis, gallstones, intestinal stasis, phthisis, cardiac disease, and chronic nephritis, (ii) associated with abnormalities of gastric secretion, namely, hyperacidity, subacidity, achylia gastrica, and hypersecretion or gastro-succorrhœa, and (iii) associated with delayed evacuation of the stomach, due to motor insufficiency (tonic dyspepsia) and to pyloric obstruction. While regarding the majority of cases of indigestion as due to a cause outside the stomach, he lays great stress on examination of the gastric contents, as it is wrong to attempt treatment without the information that can thus be obtained, and in an appendix gives an account of the methods of investigating the motor functions of the stomach and those for the qualitative and quantitative examination of the gastric contents. The use of radiography in gastric disease is very briefly considered and without any enthusiasm. Gastric cancer is said to be preceded by long-standing chronic dyspepsia in at least 40 per cent of the cases, thus contrasting with Professor MacLean's opinion that this sequence of events is very rare. Written with a long experience of surgery, this handbook is yet restrained in its advocacy of surgical interference.

Contributions to Psychiatry, Neurology and Sociology, dedicated to the late Sir Frederick Mott, K.B.E., by his Colleagues, Friends and Former Pupils Edited on behalf of the Mott Memorial Committee by J R Lord, C.B.E., M.D. Super-royal, pp. xiv and 401, numerous plates and text illustrations London H K. Lewis & Co., Ltd., 1929 21s

It is most appropriate that Sir Frederick Mott's great services should be dutifully emphasized in a volume of contributions by his colleagues, friends and former pupils, edited on behalf of the Mott Memorial Committee by Dr J R Lord. His fellow student at University College Hospital, Professor W D Halliburton, recalls "Uncle" Mott, as he was then called as a testimony to his benevolent aspect and the universal affection he inspired, when a resident, as a singer much in request, a witty speaker at the Medical Society, and as an original worker. This is followed by thirty contributions on very various subjects, Dr W A Aikin describes Mott's activities in connection with the Society of English Singers and Phonological Science, of which he was president in 1924-25. Professor C von Monakow of Zürich writes on Mott's life and work and shows how wide a view he took of insanity and lays stress on his investigation into the influence exerted by the endocrine glands. The other papers are scientific accounts of the subjects by authorities in Holland, France, Germany, Italy, Sweden, Japan, the United States of North America, Canada, and, of course, by many in this country. Sir Edward Sharpey-Schafer, with whom Mott did experimental work on cerebral localization in 1890, gives a critical account of some common errors in neurological nomenclature, and,

THE PRACTITIONER

while admitting that some of them are now too firmly entrenched to be corrected, concludes with the wish that they could be arrested before they are perpetrated Professor Elliot Smith pays a tribute by discussing, in an article on the variations in the folding of the visual cortex in man, some of the problems raised by Mott's Bowman Lecture in 1904 Accuracy in the assessment of alcoholic morbidity, another subject which Sir Frederick elucidated, is considered by Dr E Mapother and Dr Bernard Hart on the etiology of alcoholism Professor G H Monrad-Krohn of Oslo writes on some settled and unsettled problems in *neuro-syphilis*, and Professor Felix Plaut of Berlin on the geographical distribution of general paralysis Dr Golla, who succeeded Mott, and Dr Cook deal with the knee-and ankle-reflexes Mott's former assistant, Dr Pickworth, reviews our knowledge of the relation of mental disorder to deficient oxidation in the brain tissue, and Professor Pighine describes the chemical and histological changes in the nervous tissues in dogs after thyroideectomy The early treatment of mental disorder is considered in two articles by Sir Hubert Bond and by Dr Helen Boyle Space does not allow even a mention of all the valuable articles, but two of rather special interest are those of "Ibsen, the Apostle of the Psychopath," by Dr S Ely Jelliffe of New York, and Dr F Petersen's essay on "Mind, Religion and Medicine"

Elementary Medicine in Terms of Physiology By D W CARMALT JONES, M.A., M.D., F.R.C.P. Demy 8vo, pp. viii and 360, illustrations 4 London H K Lewis & Co., Ltd., 1929 12s 6d

PROFESSOR CARMALT JONES, now of Otago University, and formerly of the Westminster Hospital, has, in this work, which he wrote in 1914, largely under the influence of the late Sir James Mackenzie, and rewrote, without reference to the first draft, after the war, embodied the experience of some twenty years' study and teaching of elementary medicine As its title indicates, the object of this book is to construct the principles of medicine on those of physiology, and no attempt is made to cover the whole field of medicine In the first chapter some problems of medicine are considered, life is defined as adaptation to environment, health as efficient adaptation to the environment, and disease as "the condition which results when the body has been unable to adapt itself to its environment or to resist its stresses", the causes of disease, such as old age, poisons, infections, injury, are then summarized The symptoms and signs generally are next dealt with, and in the remaining fifteen chapters the special systems of the body are dealt with in turn, beginning with the organs of circulation and respiration, and ending with disorders of the blood and metabolism There is a short section with the attractive heading, "Disease of the Capillaries", asthma, considered under diseases of the respiratory system, is divided into several categories, one being the toxic, which is sometimes, though as pointed out a misnomer, spoken of as an anaphylactic phenomenon in mentioning the remarkable disappearance of chlorosis during this century he says that during seven years in New Zealand he has seen

REVIEWS OF BOOKS

one case only. In the section on goitre reference is made to Chatu work in 1850 on its relation to iodine, and to the recent investigations by workers, especially Drennan and Hercus, in New Zealand. The last section in this interesting book gives a brief general summary of our knowledge of fever.

Manson's Tropical Diseases. A Manual of the Diseases of Warm Climates Edited by PHILIP H. MANSON-BAHR, D.S.O., M.I., F.R.C.P. Ninth edition, revised. Demy 8vo, pp. xxii, 921, 23 colour plates, 12 half-tone plates, 401 figures, 6 maps, and 34 charts. London: Cassell & Co., 1929. 31s 6d.

THE ninth edition of this classical work, which first appeared in 1898, has again been thoroughly revised by Dr Manson-Bahr, and a number of new illustrations added. The size and contents of the work have of course greatly changed since the last century, but it is pleasing to find that it still begins with the original author's introduction dealing with the etiology of tropical diseases. Among the subjects on which revision of previous opinion has been necessary in this edition reference may be made to the article on yellow fever, in which Noguchi's view that the causal organism is a leptospira is now superseded by the ultramicroscopic virus, as shown by the work of Adrian Stokes, Bauer and Hudson. The wealth and beauty of the illustrations, a fitting supplement to the text, add enormously to the value of this well-known standard textbook.

The Custom of Couvade By WARREN R. DAWSON, F.R.S.E. Demy 8vo, pp. x and 118. Frontispiece. Manchester University Press, 1929. 7s 6d.

COUVADE (hatching) a word introduced in 1865 by the late Sir E. B. Tylor, signifies the strange custom requiring the father of a child to behave as though he were undergoing the rigours of confinement at or before its birth and for some time after that event. The details differ in various parts of the world, and though in some instances the husband may be allowed a lazy time, in others he may be severely dieted, starved, and deprived of tobacco. In this monograph, dedicated to Professor G. Elliot Smith, and Number 4 in the Ethnological Series of the publications of the University of Manchester, Mr Warren R. Dawson has collected in a compact form all that has been written, with carefully verified references to more than a hundred sources, on this remarkable subject. In successive chapters the practice of couvade is detailed in Europe, Africa, Asia, the islands in the Indian Ocean, and through Indonesia and Melanesia, and in America. Mr Dawson, like Professor G. Elliot Smith, believes that this custom has spread according to the heliolithic sphere of influence, and did not arise independently in different parts of the world. The various explanations given of the practice are recalled, and while dismissing some as fantastic, he concludes that the original motive of couvade is unknown. An appendix gives up in type

Preparations, Inventions, Etc.

AVERTIN

by (London Bayer Products, Ltd., 19, St Dunstan's Hill, E.C.3)

In the history of anaesthesia in surgery there are two great landmarks, namely, the introduction of inhalation anaesthesia, first with ether and then with chloroform, and the introduction of local anaesthesia. When local anaesthetics were introduced it was assumed by many that general anaesthetics would soon be things of the past, but this promise has not been fulfilled, chiefly because of the psychological effect of a local anaesthetic in major operations, which subjected sensitive patients to a severe and even a dangerous degree of shock. Not that inhalation anaesthetics are free from danger from the same cause, the mental distress caused to a patient about to undergo an anaesthetic for any operation, however trivial, may be very serious, so much so that many patients aver that they dislike and fear the anaesthetic more than the operation. Many attempts have therefore been made in the past to save the patient from having to undergo this shock in inhalation anaesthesia, and among the different methods employed one has been the method of rectal administration. The preparations used for this purpose in the past have not been wholly successful, especially because ether—even in an oily solution—is an irritant to mucous membrane, and severe irritation of the bowel wall was unavoidable, while a considerable proportion of cases had intestinal haemorrhages, diarrhoea, and severe pain. A suitable anaesthetic for rectal administration must be non-irritant to mucous membrane, must not in general increase the danger of narcosis, and still must be strong enough that with a non-dangerous dose at least basal anaesthesia can be attained, so that only a relatively small amount of another anaesthetic need be called upon in aid. These requirements appear to us to have been incorporated in the preparation tribromethanol, manufactured by the Bayer Products Company, to which they have given the name Avertin. It is a white crystalline substance now put on the market in the form of "avertin fluid," the crystals being held in solution by the addition of amyrene hydrate. The method of administration is by a 3 per cent aqueous solution of avertin fluid, prepared at a temperature not exceeding 40°C (104°F), and injected into the rectum by means of a rubber catheter. The dosage is calculated on the body-weight, the most successful results in basal anaesthesia having been obtained with an average dose not exceeding 0.1 c.c. avertin fluid per kilogram body-weight. The objection to full avertin narcosis hitherto has been the fact that the operator is completely dependent upon the absorption rate of the solution by the rectal mucous membrane. But the attainment of a

basal anaesthesia, after which full narcosis is brought about by the addition of a minimum amount of an inhalation anaesthetic, not only eliminates the psychical disadvantages of inhalation anaesthesia only, but also delimits the risk necessarily attendant upon any narcotic substance administered by way of the bowel. Since avertin was first introduced in Germany in 1926, many thousands of cases of its employment in a wide field of surgery have been reported in German medical literature. In this country avertin has had exhaustive preliminary tests under the auspices of the Anæsthetics Committee of the Medical Research Council, and in the hands of a number of representative anæsthetists and surgeons, some of whom have already published reports in the medical journals. Although anæsthetists in this country are, perhaps fortunately, of conservative habit, and are inclined to dislike the idea that there may be less control once a rectal anaesthetic is administered than in the continuous administration of an inhalation anaesthetic, yet it seems to us that the case in favour of avertin as a basal anaesthetic has been fully made out and proved. Avertin—like, in fact, any other anaesthetic—cannot be administered in a lighthearted way, but carefully measured for the individual patient and given with a full sense of responsibility, it seems to us to possess many advantages over older methods of anaesthesia.

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The necessity for proper regulation of the dietary in connection with the successful treatment of rheumatism, obesity, gout, and disorders of the digestive system is well recognized, and one of the greatest difficulties is with regard to the starches. Starch is a vital necessity to the normal body, and is most easily provided in the form of bread. But sufferers from the disorders mentioned find that the ordinary breads contain excessive amounts of starch, and require bread made of specially prepared flours. Appleby's starch-reduced flours are not intended to tickle the jaded palate or give a temporary appetite, they are prepared to meet a special need. The bread prepared from them is not only palatable, but highly nutritious, the protein content being considerably higher than in ordinary bread. In addition to bread, these flours also make excellent scones, biscuits, pastry, rusks, etc. Appleby's starch-free diabetic flour is specially prepared to meet the necessities of the most severe case of diabetes, and is intended to be used when a starch-free dietary must be adhered to. Its extremely high protein content (63.5 per cent) makes it also an admirable substitute for flesh foods. These flours are easy to bake and are all extremely palatable.

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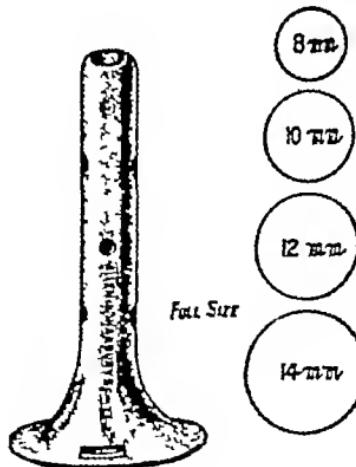
We have received samples of Pilsner Urquell beer, the original Pilsner beer which is brewed by and under the direct control of the

ouncillors of the town of Pilsen. This beer is produced from barley malt and Saar hops, and contains no added matter, the water used is from the well in the town, and fermentation takes place in cellars own out of sandstone rocks, extending over seven miles, so that a uniform temperature prevails. We find that this Pilsner beer contains only a relatively small quantity of alcohol, decidedly less than other beers with the same percentage of sugar substances. In our opinion such a beer as this, taken in moderate quantity, cannot but be an excellent stomach tonic, and it may be recommended with confidence in appropriate cases of dyspepsia in convalescence, in hyperacidity, and in loss of appetite in old people.

DYSMENORRHEA TUBES OR UTERINE STEMS.

ondon Messrs Allen and Hanburys, Ltd, 48, Wigmore St, W 1)

Mr W. MoKim McCullagh, F R C S (London, W), writes — dilatation of the cervix for dysmenorrhœa gives freedom from pain of the spasmodic type for only twelve to fourteen months, a rule. Stems have been used to ensure prolonged dilatation after the time of operation, and are inserted for four to five days. Their use lengthens the time of freedom from recurrence of the pain. As those in use are usually of solid glass, and so prevent damage of the uterine cavity, and also as their size is not graduated to suit different sizes of uterus, it was thought that the nest of stems illustrated in the diagram would be an improvement. They are



er electro-plated on brass and of four sizes, 8, 10, 12, 14, responding to the sizes of Hegar's dilators. They are hollow, rounded at the upper end, and the wall of the tube is perforated with small holes. The base has two holes for the insertion of a withdrawal tape. They are long enough to occupy the uterine cavity, and so straighten an acute anteflexion of the corpus uteri. The cervix and body of the uterus are dilated to the extent desired, a stem the size smaller is inserted after steadyng and exposing the cervical canal by vulsellæ on the anterior and posterior lips.

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S. R. Nisley, M. D., Late Surgeon Second Pennsylvania Cavalry, Elizabethtown, Pa., U. S. A. "In the recent epidemic of Typhoid Fever that prevailed in this locality, I had an excellent opportunity of testing the nutritious elements of VALENTINE'S MEAT-JUICE. In one particular case where there was stiffness in the jaws rendering deglutition difficult, from the onslaught of the malady, I sustained life by the administration of VALENTINE'S MEAT-JUICE beyond a fortnight. I have no hesitation in saying that it is borne with impunity by the most delicate stomach and will be found to be an invaluable adjunct to the list of our therapeutic agents."



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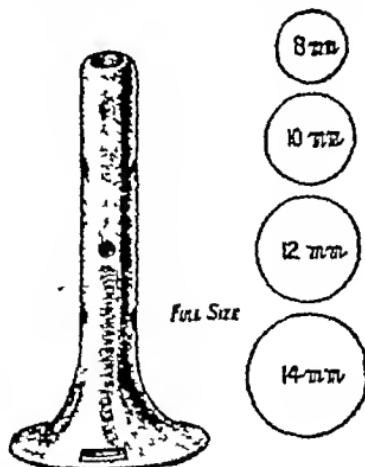
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London Messrs Allen and Hanburys, Ltd, 48, Wigmore St, W1

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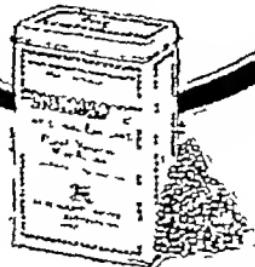
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ALEXANDER, B. M.D., C.M., appointed Resident Surgical Officer at the Manchester Royal Eye Hospital

BROOKFIELD, R. W. M.D., Ch.B. Liverp., D.P.H., appointed Hon. M.O., Royal Southern Hospital, Liverpool

CUBITT, A. W. B.M., B.Ch., appointed House Physician, King's College Hospital

CUMINGS, J. N. M.B., B.S., appointed House Physician, King's College Hospital

EASTON, J. H. M.R.C.S., L.R.C.P., appointed House Physician (Children and Neurology), King's College Hospital

FERGUSON, FERGUSON, M.D. Vict., M.R.C.P. Lond., D.P.H. Manch., appointed Honorary Assistant Physician to the Manchester Royal Infirmary

FERRABY, G.S., M.R.C.S., L.R.C.P., appointed House Surgeon, King's College Hospital

GAINS, JOHN E. M.R.C.S., L.R.C.P. Lond., appointed Resident Medical Officer, Branston Hall Sanatorium, Lincoln

GRIFFITHS, J. I. M.B., B.S. Lond., appointed Third Assistant M.O. to the Hammersmith Board of Guardians

HALER, D. H. L.S.A., appointed Resident Assistant Clinical Pathologist and House Physician to Dermatological Department, King's College Hospital

HALL, V. F. M.R.C.S., L.R.C.P., appointed House Anæsthetist, King's College Hospital

HOLT, H. M. M.B., B.S. Lond., M.B., Ch.B. Leeds., D.P.H., appointed Assistant Medical Officer of Health, Hull

HOLT, H. MAINWARING, M.B., B.S. Lond., D.P.H. Leeds., appointed Assistant Medical Officer of Health, Hull City

HOSKIN, E. M. M.R.C.S., L.R.C.P., appointed Radiologist, King's College Hospital

KNOX, H. N. M.R.C.S., L.R.C.P., appointed to the Obstetrical and Gynaecological Department (Junior), King's College Hospital

LING, W. H. G. M. F.R.C.S. Edin., appointed Hon. Surgeon to the Keighley and District Victoria Hospital

LITTLE, R. C. M.B., Ch.B. Edin., appointed Certifying Surgeon under the Factory and Workshop Acts for Witham, Essex

LIVINGSTONE, G. H. M.R.C.S., L.R.C.P., appointed Senior Casualty Officer, King's College Hospital

LYLE, T. K. M.R.C.S., L.R.C.P., appointed House Surgeon to Ophthalmic Department, King's College Hospital

MACBETH, R. G. B.M. B.Ch., appointed in the Aural and Throat Department, King's College Hospital

MACGLASSON, J. M.B., Ch.B. Edin., appointed Parochial Medical Officer and Vaccinator, Canongate

MAY, K. S. M.R.C.S., L.R.C.P., appointed to the Urological Department, King's College Hospital

NICOLL, D. A. M.R.C.S., L.R.C.P., appointed Junior House Surgeon to Aural and Throat Department, King's College Hospital

ORME, C. R. L. M.R.C.S., L.R.C.P., appointed to the Orthopaedic Department and Third Casualty Officer, King's College Hospital

PAPER, A. J. M.R.C.S., L.R.C.P., appointed Junior House Anæsthetist, King's College Hospital

PLAYFAIR, P. H. L. M.R.C.S., L.R.C.P., appointed to the Obstetrical and Gynaecological Department (Senior), King's College Hospital

RAE, HARRY J. D.S.O., M.B. Aberd., D.P.H., appointed Medical Officer of Health for City of Aberdeen

REES, H. L. M.R.C.S., L.R.C.P., appointed House Surgeon, King's College Hospital

SMITH, D. S. M.B., Ch.B. Glas., appointed Certifying Surgeon under the Factory and Workshop Acts for Lesmahagow, Lanark.

STEPHEN, ALICE, M.B., Ch.B. Edin., appointed Assistant Medical Officer of Health, Hull

TAYLOR, I. M.R.C.S., L.R.C.P., appointed Second Casualty Officer, King's College Hospital

THOMSON, G. S. M.D., Ch.B. Glasg., D.P.H., appointed Part time Lecturer in Public Health Administration in the University of Belfast

THORNTON, J. W. M.R.C.S., L.R.C.P., appointed House Surgeon, King's College Hospital

EXTRACT FROM REPORT

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